Sun SPARC Enterprise™ M3000/M4000/M5000/M8000/M9000 Servers Administration Guide

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Preface

This manual contains initial system configuration instructions for system administrators of the Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 servers. It is written for experienced system administrators with working knowledge of computer networks, and advanced knowledge of the Solaris Operating System. This manual documents entry-level (M3000), midrange (M4000 and M5000) and high-end (M8000 and M9000) servers.

Related Documentation

Related documents include:

Application	Title
Product Notes	*Sun SPARC Enterprise™ M3000 Server Product Notes*
Product Notes	*Sun SPARC Enterprise M4000/M5000 Servers Product Notes*
Product Notes	*Sun SPARC Enterprise M8000/M9000 Servers Product Notes*
Glossary	*Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Glossary*
Installation	*Sun SPARC Enterprise M3000 Server Installation Guide*
Installation	*Sun SPARC Enterprise M4000/M5000 Servers Installation Guide*
Installation	*Sun SPARC Enterprise M8000/M9000 Servers Installation Guide*
Service	*Sun SPARC Enterprise M3000 Server Service Manual*
Service	*Sun SPARC Enterprise M4000/M5000 Servers Service Manual*
Service	*Sun SPARC Enterprise M8000/M9000 Servers Service Manual*

Application	Title
Software Administration	*Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*
Software Administration	*Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF Reference Manual*
Software Administration	*Sun SPARC Enterprise M4000/M5000/M8000/M9000 Servers Dynamic Reconfiguration (DR) User's Guide*
Capacity on Demand Administration	*Sun SPARC Enterprise M4000/M5000/M8000/M9000 Servers Capacity on Demand (COD) User's Guide*

You can find these related documents, as well as the Solaris™ Operating System documentation collection, at:

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CHAPTER 1

Introduction to Server Software and Configuration

This manual describes initial system configuration of the SPARC Enterprise™ M3000/M4000/M5000/M8000/M9000 servers. This product line has entry-level (M3000), midrange (M4000 and M5000) and high-end (M8000 and M9000) servers.

Note – The midrange and high-end servers support the following features, while the entry-level server does not: Dynamic Reconfiguration (DR), multiple domains, PCI hotplug, Capacity on Demand (COD), and the optional External I/O Expansion Unit.

Once you have completed the initial configuration processes described here, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for day-to-day system administration and management tasks.

This chapter provides an overview of server firmware, server software, and initial system configuration. It has these sections:

- XSCF Firmware
- Solaris OS Software
- Software Services
- Preparing for System Configuration
- Related Information

XSCF Firmware

Your server provides system management capabilities through eXtended System Controller Facility (XSCF) firmware, pre-installed at the factory on the Service Processor[1] boards.

The XSCF firmware consists of system management applications and two user interfaces to configure and control them:

- XSCF Web, a browser-based graphical user interface
- XSCF Shell, a terminal-based command-line interface

You can access the XSCF firmware by logging in to the XSCF command shell. This document includes instructions for using the XSCF interface as part of the initial system configuration. For more information about the XSCF firmware, see Chapter 2, and the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

XSCF firmware, OpenBoot™ PROM firmware, and power-on self-test (POST) firmware are known collectively as the XSCF Control Package (XCP).

XSCF firmware has two networks for internal communication. The Domain to Service Processor Communications Protocol (DSCP) network provides an internal communication link between the Service Processor and the Solaris™ domains. The Inter-SCF Network (ISN) provides an internal communication link between the two Service Processors in a high-end server.

On a high-end server with two Service Processors, one Service Processor is configured as *active* and the other is configured as *standby*. This redundancy of two Service Processors allows them to exchange system management information and, in case of failover, to change roles. All configuration information on the active Service Processor is available to the standby Service Processor.

Solaris OS Software

The Solaris OS is pre-installed at the factory on one domain by default. Within its domain, the Solaris OS includes features to manage Solaris OS system capabilities.

1. The Service Processor is sometimes referred to as the XSCF Unit, or XSCFU.

Note – The XSCF firmware requires that all domains have the SUNWsckmr and SUNWsckmu.u packages. Since the Core System, Reduced Network, and Minimal System versions of the Solaris OS do not automatically install these packages, you must do so on any such domains that do not already have them.

You can install applications on the domains. That process is managed through the Solaris OS tools. Likewise, any other software management applications that you prefer to use on the domains must be installed through the Solaris OS tools.

The DSCP network provides an internal communication link between the Service Processor and the Solaris domains.

Software Services

TABLE 1-1 contains an overview of XSCF firmware services and networks that are part of your server, and where they are documented.

TABLE 1-1 Software Services

Service	Description
Access control	Access control includes logging in to the system, user accounts, passwords, privileges, and XSCF firmware control. See Chapter 2.
Initial system configuration	Initial configuration of the services for the Service Processor and the domains, including DSCP network, XSCF network, DNS name service, LDAP service, NTP service, HTTPS service, Telnet service, SSH service, SNMP service, and SMTP service. See Chapter 3.
Domain configuration	Each domain runs its own copy of the Solaris OS. Domains are managed by the Service Processor XSCF firmware, and communicate with the Service Processor over the DSCP network. You can access a domain console from the Service Processor or, if your system is networked, log in to a domain directly. See Chapter 4.
Auditing	The auditing function logs all security-related events. See Chapter 5.
Log archiving	The log archiving function allows you to set up a remote host to automatically receive and store log data from your server. See Chapter 6.

TABLE 1-1 Software Services *(Continued)*

Service	Description
Capacity on demand (COD)	Capacity on Demand is an option on that allows you to purchase spare processing capacity for your midrange or high-end (but not entry-level) server. The spare capacity is provided in the form of one or more CPUs on COD boards that are installed on your server. To use the CPU processing capacity, you must purchase a license. The XSCF firmware allows you to set up and manage COD. See Chapter 7.
Security	Security is provided through access control (user names, passwords, privileges), audit logs of security-related events, and various security protocols. Your server is secure by default. That is, other than setting up user accounts and privileges, no initial configuration has to be done related to security. For example, no insecure protocols, such as Telnet, are initially enabled. See Chapter 2 and Chapter 5.
Fault management	No initial configuration is needed. • Domain fault management includes CPU, memory, and I/O (PCI/PCIe) nonfatal errors. All nonfatal errors are reported to the Solaris OS, which will attempt to take faulty CPUs offline or to retire faulty memory pages. Fatal errors are generally handled by the Service Processor. • Service Processor fault management includes fatal CPU, memory, and I/O errors (the Service Processor will exclude the faulty components upon reboot), as well as environmental monitoring (power supplies, fan speeds, temperatures, currents) and the External I/O Expansion Unit. See the Solaris OS documentation collection at `http://docs.sun.com`
Hot-replacement operations	No initial configuration is needed. PCI cards can be removed and inserted while your midrange or high-end (but not entry-level) server continues to operate. The Solaris OS `cfgadm` command is used to unconfigure and disconnect a PCI card. See the *Service Manual*, and the Solaris OS documentation collection at `http://docs.sun.com`
External I/O Expansion Unit management	No initial configuration is needed. The External I/O Expansion Unit on midrange and high-end (but not entry-level) servers is a rack mountable PCI card chassis. See the *External I/O Expansion Unit Installation and Service Manual.*

Preparing for System Configuration

This section lists the information needed for initial system configuration and the initial configuration tasks.

Information Needed

Before you configure the software, have the following available:

- Access to the Service Processor with the appropriate privileges for your tasks.

  More information about access is contained in Chapter 2.
- An unused range of IP addresses for the internal DSCP network between the Service Processor and the domains.
- Network configuration information for the Service Processor, including IP addresses, netmask, DNS server, default route, NFS server.
- The number of domains in your system. By default, there is one domain and its domain number is 0 (zero). The number of domains could be different from the default on midrange or high-end (but not entry-level) servers if you specified another number of domains when you ordered your system.
- Firmware version information if you are upgrading the XSCF firmware.
- Information for optional services that you are going to use, such as Lightweight Directory Access Protocol (LDAP) information for authentication.

Initial Configuration Tasks

Initial configuration requires these tasks:

1. Logging in to the Service Processor with the default log-in name over a serial connection. You must have physical access to the system.
2. Adding at least one user account with a minimum of one privilege, `useradm`. This user with `useradm` privileges can then create the rest of the user accounts.
3. Configuring the DSCP network.
4. Configuring the XSCF network.
5. Setting the Service Processor time. The Service Processor can be an NTP client, or an NTP client and NTP server for the domains.
6. Configuring or enabling any optional services you want to use immediately.

   These services include Telnet, SNMP, SMTP, LDAP, NTP, HTTPS, DNS, SSH, domains, log archiving, and COD. COD is not supported on the M3000 server.

Related Information

For additional information on this chapter's topics, see:

Resource	Information
man pages (see the Note following this table)	`fmdump`(8), `fmadm`(8), `fmstat`(8), `version`(8), `cfgadm`(1M)
Site Planning Guide	Site planning
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide	System configuration and administration
Solaris OS documentation collection at `http://docs.sun.com`	Solaris OS, including fault management.
Service Manual	Hot-replacement operations, fault management
External I/O Expansion Unit Installation and Service Manual	PCI card chassis

Note – man pages available on the Service Processor are followed by (8), for example, `version`(8); they are also available in the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF Reference Manual*. Solaris OS man pages available on the domains are followed by (1M), for example, `cfgadm`(1M).

CHAPTER 2

Access Control

Access control is a way of granting access to the system functions or components only to those users who have been authenticated by the system and who have appropriate *privileges*. Access control depends on the proper configuration of the general security services provided by the server.

This chapter contains these sections:

- About Access Control
- XSCF Shell Procedures for Access Control
- Related Information

About Access Control

The Service Processor is an *appliance*. In an appliance model, users or management agents can access the Service Processor and its components only through authorized user interfaces. Users and agents cannot access any of the underlying operating system interfaces, and users cannot install individual software components on the Service Processor.

These sections provide details on access control:

- Logging in to the System
- XSCF User Accounts
- XSCF Passwords
- Privileges
- XSCF Firmware Update

Logging in to the System

There are two entities that can be logged in to on the system, a Service Processor and a Solaris domain.

You initially log in to the Service Processor using a serial connection from a terminal device. A terminal device can be an ASCII terminal, a workstation, or a PC. For details on serial port connections, see the *Installation Guide* for your server or the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

A unique login account with the user name of `default` exists on the Service Processor. This account is unique in the following ways:

- It can never be logged in to using the standard UNIX user name and password authentication or SSH public key authentication.
- It can only be logged in to using a procedure that requires physical access to the system.
- Its privileges are fixed to be `useradm` and `platadm`; you cannot change these privileges.
- It cannot be deleted, it has no password, and no password can be set for it.

After initial configuration, you can log in to the Service Processor using a serial connection or an Ethernet connection. You can redirect the XSCF console to a domain and get a Solaris console. You can also log in to a domain directly using an Ethernet connection to access the Solaris OS.

When a user logs in, the user establishes a *session*. Authentication and user privileges are valid only for that session. When the user logs out, that session ends. To log back in, the user must be authenticated once again, and will have the privileges in effect during the new session. See "Privileges" on page 10 for information on privileges.

Lockout Period Between Login Attempts

After multiple XSCF login failures, no further login attempts are allowed for a certain amount of time. To set the lockout period, use the `setloginlockout`(8) command. To view the lockout period, use the `showloginlockout`(8) command. For more information, see the `setloginlockout`(8) and `showloginlockout`(8) man pages.

Note – The ability to specify and view the lockout period was added in a recent XCP update. Please see the Product Notes for the firmware release running on your server (no earlier than the XCP 1080 release) for possible restrictions.

XSCF User Accounts

A user account is a record of an individual user that can be verified through a user name and password.

When you initially log in to the system, add at least one user account with a minimum of one privilege, `useradm`. This user with `useradm` privileges can then create the rest of the user accounts. For a secure log in method, enable SSH service. See "To Enable or Disable the Service Processor SSH Service" on page 45 and to "To Generate a Host Public Key for SSH Service" on page 46 for more information.

Note – You cannot use the following user account names, as they are reserved for system use: root, bin, daemon, adm, operator, nobody, sshd, rpc, rpcuser, ldap, apache, ntp, admin, and default.

XSCF supports multiple user accounts for log in to the Service Processor. The user accounts are assigned privileges; each privilege allows the user to execute certain XSCF commands. By specifying privileges for each user, you can control which operations each XSCF user is allowed to perform. On its own, a user account has no privileges. To obtain permission to run XSCF commands and access system components, a user must have privileges.

You can set up the Service Processor to use an LDAP server for authentication instead. To use LDAP, the Service Processor must be set up as an LDAP client. For information about setting up the Service Processor to use the LDAP service, see "LDAP Service" on page 23. If you are using an LDAP server for authentication, the user name must not be in use, either locally or in LDAP.

XSCF Passwords

User passwords are authenticated locally by default unless you are using an LDAP server for authentication.

Site-wide policies, such as password nomenclature or expiration dates, make passwords more difficult to guess. You can configure a password policy for the system using the `setpasswordpolicy` command. The `setpasswordpolicy` command describes the default values for a password policy.

If you have lost password access to your system, use the procedure "To Log in Initially to the XSCF Console" on page 12.

Privileges

Privileges allow a user to perform a specific set of actions on a specific set of components. Those components can be physical components, domains, or physical components within a domain.

The system provides the predefined privileges shown in TABLE 2-1. These are the only privileges allowed in the server. You cannot define additional privileges.

TABLE 2-1 User Privileges

Privilege	Capabilities
`none`	None. When the local privilege for a user is set to `none`, that user has no privileges, even if privileges for that user are defined in LDAP. Setting a user's local privilege to `none` prevents the user's privileges from being looked up in LDAP.
`useradm`	Can create, delete, disable, and enable user accounts. Can change a user's password and password properties. Can change a user's privileges. Can view all platform states.
`platadm`	Can perform all Service Processor configuration other than the `useradm` and `auditadm` tasks. Can assign and unassign hardware to or from domains. Can perform domain and Service Processor power operations. Can perform Service Processor failover operations on systems with more than one Service Processor. Can perform all operations on domain hardware. Can view all platform states.
`platop`	Can view all platform states.
`domainadm`	Can perform all operations on hardware assigned to the domain(s) on which this privilege is held. Can perform all operations on the domain(s) on which this privilege is held. Can view all states of the hardware assigned to the domain(s) on which this privilege is held. Can view all states of the domain(s) on which this privilege is held.
`domainmgr`	Can perform domain power operations. Can view all states of the hardware assigned to the domain(s) on which this privilege is held. Can view all states of the domain(s) on which this privilege is held.
`domainop`	Can view all states of the hardware assigned to the domain(s) on which this privilege is held. Can view all states of the domain(s) on which this privilege is held.

TABLE 2-1 User Privileges *(Continued)*

Privilege	Capabilities
`auditadm`	Can configure auditing. Can delete audit trail.
`auditop`	Can view all audit states and the audit trail.
`fieldeng`	Can perform all operations reserved for field engineers.

The `domainadm`, `domainmgr`, and `domainop` privileges must include the domain number, numbers, or range of numbers to associate with a particular user account.

A user can have multiple privileges, and a user can have privileges on multiple domains.

User privileges are authenticated locally by default. You can set up the Service Processor to use an LDAP server for authentication instead. For information about setting up the Service Processor to use the LDAP service, see "LDAP Service" on page 23.

If no privileges are specified for a user, no local privilege data will exist for that user; however, the user's privileges can be looked up in LDAP, if LDAP is being used. If a user's privileges are set to `none`, that user does not have any privileges, regardless of privilege data in LDAP.

XSCF Firmware Update

The Service Processor firmware can only be updated as an entire *image*, known as an XCP image. The image includes the XSCF firmware, OpenBoot PROM firmware, POST firmware, and miscellaneous files. Only valid images authorized by Sun Microsystems or Fujitsu can be installed.

The XCP image is installed in the Service Processor flash memory. You need `platadm` or `fieldeng` privilege to update an XCP image. More information on updating an XCP image is contained in the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

Saving and Restoring XSCF Configuration Information

To save and restore XSCF configuration information, use the `dumpconfig`(8) and `restoreconfig`(8) commands in the XSCF shell. The commands permit you to specify the location where the information is to be stored and retrieved. For more information, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* and the `dumpconfig`(8) and `restoreconfig`(8) man pages.

Note – The XCP 1080 firmware is the first XCP release to support the `dumpconfig`(8) and `restoreconfig`(8) commands.

XSCF Shell Procedures for Access Control

This section describes these procedures:

- To Log in Initially to the XSCF Console
- To Add an XSCF User Account
- To Create a Password for an XSCF User
- To Configure an XSCF Password Policy
- To Assign Privileges to an XSCF User
- To Display the Version of Installed Firmware

▼ To Log in Initially to the XSCF Console

This procedure can be used for initial login or for lost password access.

1. **Log in to the XSCF console with the default login name from a terminal device connected to the Service Processor. You must have physical access to the system.**

```
serial port log-in prompt: default
```

You are prompted to toggle the Operator Panel MODE switch (keyswitch) on the front of the system. The location of the MODE switch on an entry-level server is shown in FIGURE 2-1. The location of the MODE switch on a midrange server is shown in FIGURE 2-2. And the MODE switch on a high-end server is mounted horizontally rather than vertically, as shown in FIGURE 2-3. The MODE switch has two positions: Service and Locked.

Note – In the following illustrations, the three LEDs appear first, followed by the POWER button, then the MODE switch.

FIGURE 2-1 Location of the Operator Panel MODE Switch on an Entry-Level Server

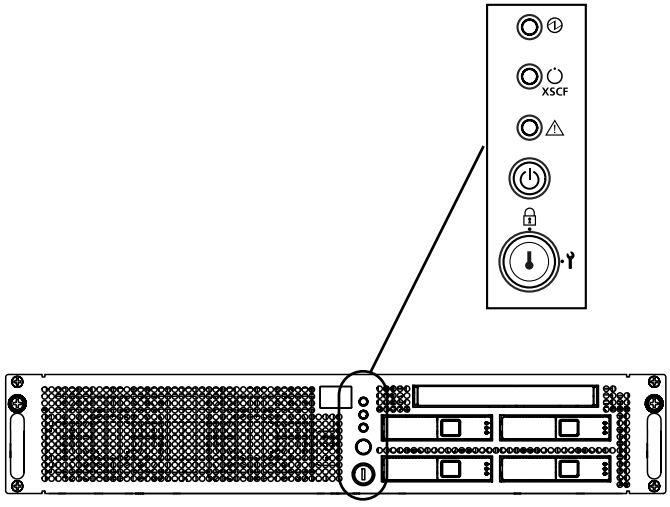


FIGURE 2-2 Location of the Operator Panel MODE Switch on a Midrange Server

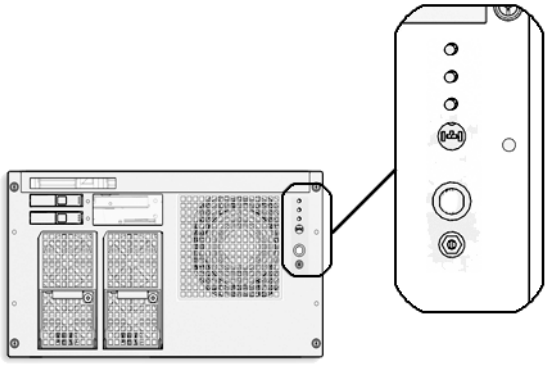
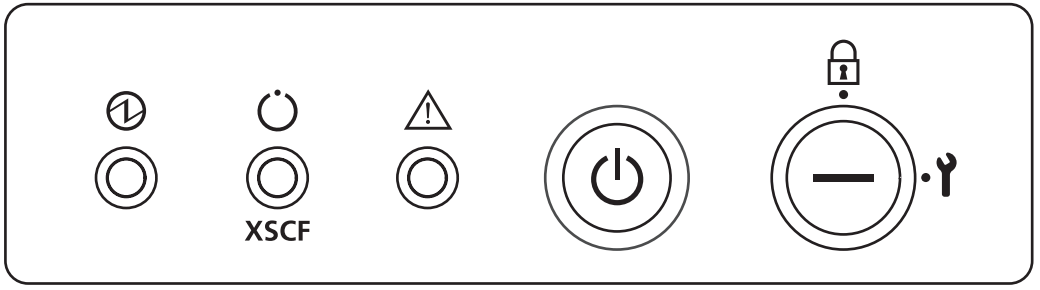


FIGURE 2-3 Operator Panel on a High-end Server



You must toggle the MODE switch within one minute of the login prompt or the login process times out.

2. **Toggle the MODE switch using one of two methods, as follows:**

- If the switch is in the Service position, turn it to the Locked position, leave it there for at least five seconds, and then turn it back to the Service position. Press the `Enter` key.

- If the switch is in the Locked position, turn it to the Service position, leave it there for at least five seconds, and then turn it back to the Locked position. Press the `Enter` key.

  When the toggling is successful, you are logged in to the Service Processor shell as the account `default`.

```
XSCF>
```

  As this account has `useradm` and `platadm` privileges. you can now configure the Service Processor or reset passwords.

When the shell session ends, the `default` account is disabled. When an account is disabled, it cannot be used to log in at the console. It will then not be possible to login using this account again except by following this same procedure.

Note – You can use the `setupplatform`(8) command rather than the following procedures to perform Service Processor installation tasks. For more information, see the `setupplatform`(8) man page.

▼ To Configure an XSCF Password Policy

1. **Log in to the XSCF console with `useradm` privileges.**

2. **Type the `setpasswordpolicy` command:**

```
XSCF> setpasswordpolicy option
```

   where *option* can be one or more of the options described in the `setpasswordpolicy`(8) man page.

Note – The password policy applies only to users added after the `setpasswordpolicy`(8) command has been executed.

---

3. **Verify that the operation succeeded by typing the `showpasswordpolicy` command**.

▼ To Add an XSCF User Account

When you add a new user account, the account has no password, and cannot be used for logging in until the password is set or Secure Shell public key authentication is enabled for the user.

1. **Log in to the XSCF console with** `useradm` **privileges.**
2. **Type the** `adduser` **command:**

```
XSCF> adduser user
```

where *user* is the user name you want to add. (See the `adduser`(8) man page for rules about the *user* name.) If you do not specify a User ID (UID) number with the `-u UID` option, one is automatically assigned, starting from 100.

3. **Verify that the operation succeeded by typing the** `showuser` **command**.

▼ To Create a Password for an XSCF User

Any XSCF user can set his or her own password. Only a user with `useradm` privileges can set another user's password.

1. **Log in to the XSCF console with** `useradm` **privileges.**
2. **Type the** `password` **command:**

```
XSCF> password
Please enter your password:
```

See the `password`(8) man page for rules about passwords. When typed without an argument, `password` sets the current user's password. To set someone else's password, include that person's user name, for example:

```
XSCF> password user
Please enter your password:
```

where *user* is the user name you want to set the password for. You are prompted to enter, and then reenter, the password.

▼ To Assign Privileges to an XSCF User

1. **Log in to the XSCF console with** `useradm` **privileges.**

2. **Type the `setprivileges` command:**

```
XSCF> setprivileges user privileges
```

where *user* is the user name to assign privileges for, and *privileges* is one or more privileges, separated by a space, to assign to this user. The `domainadm`, `domainmgr`, and `domainop` privileges must include the domain number, numbers, or range of numbers to associate with a particular user account; for example,

```
XSCF> setprivileges user domainadm@1-4, 6, 9
```

Valid privileges are listed in TABLE 2-1.

▼ To Display the Version of Installed Firmware

1. **Log in to the XSCF console with** `platadm` **or** `fieldeng` **privileges.**
2. **Type the** `version` **command:**

```
XSCF> version -c xcp
```

The XCP version number is displayed. Command output example is:

```
XSCF> version -c xcp
XSCF#0(Active)
XCP0 (Current): 1080
...
```

Related Information

For additional information on this chapter's topics, see:

Resource	Information
man pages	`password`(8), `version`(8), `adduser`(8), `deleteuser`(8), `enableuser`(8), `disableuser`(8), `showuser`(8), `setpasswordpolicy`(8), `setprivileges`(8), `showpasswordpolicy`(8), `setlookup`(8), `setldap`(8), `showldap`(8)
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide	Access control, user accounts, passwords, firmware update

CHAPTER 3

System Configuration

This chapter describes how to initially configure system services and internal networks that enable communication between the components of your server.

This chapter contains these sections:

- About System Services
- XSCF Shell Procedures for System Configuration
- Related Information

About System Services

Your server uses various services to enable communication between its components. See "Preparing for System Configuration" on page 4 for an overview of initial service configuration.

These sections provide details on system services:

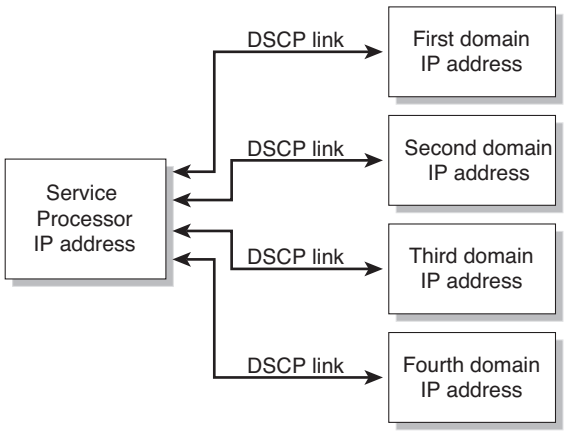
- DSCP Network Between a Service Processor and a Domain
- XSCF Network Interfaces
- Domain Name Service
- LDAP Service
- Time Synchronization and NTP Service
- SNMP Service
- Additional Services

DSCP Network Between a Service Processor and a Domain

The Domain to Service Processor Communications Protocol (DSCP) service provides a secure TCP/IP- and PPP-based communication link between the Service Processor and each domain. Without this link, the Service Processor cannot communicate with the domains.

The Service Processor requires one IP address dedicated to the DSCP service on its side of the link, and one IP address on *each* domain's side of the link. The DSCP service is a point-to-point link between the Service Processor and each domain. FIGURE 3-1 illustrates this relationship.

FIGURE 3-1 Relationship of the Service Processor and the DSCP Network to the Domains



DSCP service is not configured by default. You configure and use the service by specifying IP addresses for the Service Processor and the domains. The IP addresses should be nonroutable addresses on the network.

The `setdscp` command provides an interactive mode that displays a prompt for each DSCP setting you can configure:

- The network address to be used by the DSCP network for IP addresses
- The netmask for the DSCP network
- The Service Processor IP address
- An IP address for each domain

In a system with redundant Service Processors, the standby Service Processor does not communicate with the domains. In the event of a failover, the newly active Service Processor assumes the IP address of the failed-over Service Processor.

DSCP includes its own security measures that prohibit a compromised domain from compromising other domains or the Service Processor.

The DSCP should only be configured when there are no domains running. If you change the DSCP configuration while a domain is active, you have to power off the domain before the Service Processor can communicate with it. See Chapter 4 for more information on domains.

In a typical DSCP configuration, you enter a network address and netmask using the `setdscp` command. The system then configures the Service Processor IP address and any domain IP addresses according to this formula: the Service Processor gets an IP address that is the network address +1; and each domain gets an IP address that is the Service Processor IP address, + the domain ID, +1. For example, if you enter 10.1.1.0 for the network address, and 255.255.255.0 for the netmask, the `showdscp` command displays output similar to the following:

```
XSCF> showdscp
DSCP Configuration:
Network: 10.1.1.0
Netmask: 255.255.255.0

Location     Address
XSCF         10.1.1.1
Domain #00   10.1.1.2
Domain #01   10.1.1.3
Domain #02   10.1.1.4
Domain #03   10.1.1.5
...
```

This scenario minimizes the range of IP addresses needed for DSCP.

XSCF Network Interfaces

The XSCF network configurable settings include the IP address for the active Service Processor, IP address for the standby Service Processor, gateway address, netmask, and network route.

TABLE 3-1 lists the XSCF network interfaces.

TABLE 3-1 XSCF Network Interfaces

XSCF Unit	Interface Name	Description
XSCF Unit 0 (entry-level, midrange, and high-end servers)	`xscf#0-lan#0`	XSCF LAN#0 (external)
	`xscf#0-lan#1`	XSCF LAN#1 (external)
	`xscf#0-if`	Interface between XSCF Units (ISN: Inter SCF Network); high-end server only
XSCF Unit 1 (high-end server only)	`xscf#1-lan#0`	XSCF LAN#0 (external)
	`xscf#1-lan#1`	XSCF LAN#1 (external)
	`xscf#1-if`	Interface between XSCF Units (ISN)
	`lan#0`	Takeover IP address for XSCF LAN#0
	`lan#1`	Takeover IP address for XSCF LAN#1

On a high-end server, one Service Processor is configured as *active* and the other is configured as *standby*. The XSCF network between the two Service Processors allows them to exchange system management information and, in case of failover, to change roles. When the XSCF unit is configured with redundancy, ISN addresses must be in the same network subnet.

Optionally, a *takeover* IP address can be set up, which is hosted on the currently active Service Processor. External clients can use this takeover IP address to connect to whichever Service Processor is active. Selection of a takeover IP address does not affect failover.

When you set or change the information related to the XSCF network, including the Service Processor host name, DNS domain name, DNS server, IP address, netmask, or routing information, you must make the changes effective in XSCF and reset the Service Processor. This is done with the `applynetwork` and `rebootxscf` commands.

You configure the XSCF network with these commands:

- `setnetwork`
- `setroute`
- `sethostname` (if using DNS)
- `setnameserver` (if using DNS)
- `applynetwork`

Once you have configured the XSCF network, it requires no day-to-day management.

Domain Name Service

The Domain Name Service (DNS) allows computers on a network to communicate with each other by using centrally maintained DNS names instead of locally stored IP addresses. If you configure the Service Processor to use the DNS service, it "joins" the DNS community and can communicate with any other computer on the network through its DNS server.

There are no defaults for this service. To configure the Service Processor to use DNS, you must specify the Service Processor host name, and the DNS server name and IP address.

You can configure the Service Processor DNS service with these commands:

- `sethostname`
- `setnameserver`

On a server with dual Service Processors, the domain name is common for both Service Processors. A host name can be specified for each Service Processor. Setting a different host name for each Service Processor does not disable failover.

Once you have configured the Service Processor to use the DNS service, it does not require day-to-day management.

LDAP Service

The LDAP service stores user authentication and privilege settings on a server so that individual computers on the network do not have to store the settings.

By default, the Service Processor stores user passwords and privileges locally. Account information for users who have access to the Service Processor are stored on the Service Processor itself. (Authentication and privilege lookups for the server's domains are provided by the Solaris OS.)

However, if you want to have authentication and privilege lookups performed by an LDAP server, you can set up the Service Processor to be an LDAP client.

The general process for setting up the Service Processor as an LDAP client is:

1. Enabling the LDAP service.
2. Providing the LDAP server configuration information:
   - The IP address or hostname, and port, of the primary LDAP directory

- *Optional:* The IP address or hostname, and port, of up to two alternative LDAP directories
- The distinguished name (DN) of the search base to use for lookup
- Whether Transport Layer Security (TLS) is to be used

3. Verifying that the LDAP service is working.

On the LDAP server, you create an LDAP schema with privilege properties. The schema contains the following:

CODE EXAMPLE 3-1 LDAP Schema

```
attributetype ( 1.3.6.1.1.1.1.40 NAME 'spPrivileges'
   DESC 'Service Processor privileges'
   SYNTAX 1.3.6.1.4.1.1466.115.121.1.26
   SINGLE-VALUE )

objectclass ( 1.3.6.1.1.1.2.13 NAME 'serviceProcessorUser' SUP top
AUXILIARY
   DESC 'Service Processor user'
   MAY spPrivileges )
```

You also add the following required attributes for each user on the LDAP server, as shown in TABLE 3-2.

TABLE 3-2 LDAP LDIF File Attributes

Field Name	Description
`spPrivileges`	A valid privilege on the Service Processor
`uidNumber`	The user ID number on the Service Processor. The `uidnumber` must be greater than 100. Use the `showuser` command to display UIDs.

A sample file entry is:

CODE EXAMPLE 3-2 Sample LDAP LDIF File Attributes

```
spPrivileges: platadm
uidNumber: 150
```

See the Solaris OS documentation collection for more information on LDAP servers.

If the LDAP client is configured and enabled on the Service Processor, lookups are first performed locally, and then through the LDAP server. If you execute the `setprivileges` command for a user without specifying privileges, the command

deletes any local privilege data for that user. Subsequently, the user's privileges will be looked up in LDAP, if LDAP privilege lookup is enabled. If you specify privilege as `none`, that user will have no privileges, regardless of privilege data in LDAP.

These commands manage the Service Processor LDAP service:

- `setlookup`
- `setldap`

Note that passwords stored in the LDAP repository must use either UNIX crypt or MD5 encryption schemes.

Once you have configured the Service Processor to use the LDAP service, it does not require day-to-day management.

Time Synchronization and NTP Service

The Network Time Protocol (NTP) provides the correct timestamp for all systems on a network by synchronizing the clocks of all the systems. NTP service is provided by an NTP daemon.

To use the NTP service, the Service Processor can be set up as an NTP client, using the services of a remote NTP server. The Service Processor also can be set up as an NTP server, as can an external resource.

Note – Check the Product Notes for your server, which may contain important information about using the XSCF as NTP server.

TABLE 3-3 shows how the time is synchronized.

TABLE 3-3 XSCF and Domain Time Synchronization

Entity	Primary NTP Server	Time Synchronization Method
XSCF	No connection	The XSCF time is the time in the initial system setting or the time set with the `setdate` command.
	External NTP server	XSCF operates as an NTP client. The XSCF time is adjusted to the time of the external NTP server.
Domain	XSCF	XSCF operates as the NTP server. The domain time is adjusted to the time of the XSCF.
	External NTP server	The domain time is adjusted to the time of the external NTP server.

When domains are powered on, they synchronize their clocks to the NTP server.

If the domain and the Service Processor are using the same time source, one benefit is that events logged in the Solaris OS and on the Service Processor can be correlated based on their timestamp. If the domain and Service Processor use different NTP servers, their times may drift, and correlating log files could become difficult. If you connect a domain to an NTP server other than the one used by the Service Processor, be sure both are high-rank NTP servers that provide the same degree of accuracy.

The XSCF can be used as NTP server only for domains on the same platform.

Every NTP server and every NTP client must have an `ntp.conf` file, in `/etc/inet/ntp.conf`. The Service Processor has a default `ntp.conf` file. If you are using NTP, you must create an `ntp.conf` file on each domain.

If you are using the Service Processor as the NTP server for the domains, create an `ntp.conf` file on each domain similar to the following:

CODE EXAMPLE 3-3 Sample `ntp.conf` File for a Domain using XSCF as NTP Server

```
server ip_address
slewalways yes
disable pll
enable auth monitor
driftfile /var/ntp/ntp.drift
statsdir /var/ntp/ntpstats/
filegen peerstats file peerstats type day enable
filegen loopstats file loopstats type day enable
filegen clockstats file clockstats type day enable
```

where *ip_address* is the IP address you configured for the Service Processor on the DSCP network. To display the Service Processor's IP address, use the `showdscp -s` command.

If you are using an external NTP server for the domains, see the `xntpd`(1M) `man` page or to the Solaris OS documentation collection for information on creating the `ntp.conf` file for each domain.

SNMP Service

A Simple Network Management Protocol (SNMP) agent can be configured and enabled on the Service Processor. The Service Processor SNMP agent monitors the state of the system hardware and domains, and exports the following information to an SNMP manager:

- System information such as chassis ID, platform type, total number of CPUs, and total memory
- Configuration of the hardware

- Dynamic reconfiguration information, including which domain-configurable units are assigned to which domains
- Domain status
- Power status
- Environmental status

The Service Processor SNMP agent can supply system information and fault event information using public MIBs. SNMP managers, for example, a third-party manager application, use any Service Processor network interface with the SNMP agent port to communicate with the agent. The SNMP agent supports concurrent access from multiple users through SNMP managers.

By default, the SNMP agent uses version 3 (v3) of the SNMP protocol. SNMP v3 is secure, requiring an authentication protocol, authentication password, and encryption password. The valid authentication protocols are MD5 and SHA (secure hash algorithm). You can also configure your server to accept earlier SNMP versions 1 and 2.

The SNMP agent includes the v3 utilities for user management, the User Security Model (USM), and for view access control, the View Access Control Model (VACM). You can change the configuration of SNMP agent traps, USM user accounts, and VACM information.

Initial SNMP v3 configuration includes:

1. Creating USM user information
2. Creating VACM access control information (group, view, and access)

   Using VACM requires a basic knowledge of SNMP and MIBs. See the *Solaris System Management Agent Administration Guide* and to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for information.
3. Configuring the SNMP agent
4. Enabling the SNMP agent
5. Setting up your SNMP manager application to communicate with the Service Processor SNMP agent based on the configuration you used for the agent, namely, user, port, and trap information.

The SNMP agent is active only on the active Service Processor. In the event of failover, the SNMP agent is restarted on the newly active Service Processor.

Additional Services

This section describes HTTPS, Telnet, SMTP, and SSH services, and altitude settings.

This section does not cover all the optional services and settings for the Service Processor that you might want to set up and use at a later date. For example, you can set up mirrored memory mode using the `setupfru` command. See the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for information on day-to-day administration and management tasks.

HTTPS Service

Hypertext Transfer Protocol (HTTP) over an authenticated/encrypted connection allows you to use the XSCF web browser securely. This is called the HTTPS service. Authentication is provided with a certificate authority and private keys. To use the HTTPS service, you must enable it, and provide an optional port number. The default port is 443. To enable HTTPS service, use the `sethttps` command.

Telnet Service

Telnet service is disabled by default on the Service Processor. To enable it, use the `settelnet` command. Telnet provides an alternative for those sites that do not have `ssh`.

SMTP Service

Simple Mail Transfer Protocol (SMTP) service is controlled by these commands:

- `showsmtp`
- `setsmtp`

The authentication mechanisms allowed by the mail server are `pop`, `smtp-auth`, or `none` (the default). The SMTP authentications supported are `plain` and `login`.

SSH Service

SSH service is disabled by default. To enable it, use the `setssh` command. A host public key is required for SSH service.

Altitude Setting

The altitude for your server is set to 0 meters by default. To set it for the actual altitude of your server, use the `setaltitude` command. Executing this command causes the server to adjust the temperature thresholds it uses to protect the system so it can more accurately detect any abnormality in the intake air temperature. However, even if you do not set the altitude, any abnormality in air temperature, such as CPU temperature, can still be detected. As server temperature limits are set to protect domain hardware, execute the `setaltitude` command before powering on any domain. See `setaltitude`(8).

Note – A modification of the altitude value takes effect only after you subsequently execute the `rebootxscf` command and reset XSCF. See `rebootxscf`(8).

XSCF Shell Procedures for System Configuration

This section describes these procedures:

- To Configure the DSCP Network
- To Display DSCP Network Configuration
- To Configure the XSCF Network Interfaces
- To Configure the XSCF Network Route Information
- To Set Or Reset the XSCF Network
- To Display XSCF Network Configuration
- To Set the Service Processor Host Name and DNS Domain Name
- To Set the Service Processor's DNS Name Server
- To Enable or Disable Use of an LDAP Server for Authentication and Privilege Lookup
- To Configure the XSCF as an LDAP Client
- To Configure the XSCF as an NTP Client
- To Display the NTP Configuration
- To Set the Timezone, Daylight Saving Time, Date, and Time Locally on the Service Processor
- To Create a USM User Known to the SNMP Agent
- To Display USM Information for the SNMP Agent

- To Create a VACM Group
- To Create a VACM View
- To Give a VACM Group Access to a VACM View
- To Display VACM Information for the SNMP Agent
- To Configure the SNMP Agent to Send Version 3 Traps to Hosts
- To Enable the SNMP Agent
- To Display SNMP Agent Configuration
- To Enable or Disable the Service Processor HTTPS Service
- To Enable or Disable the Service Processor Telnet Service
- To Configure the Service Processor SMTP Service
- To Enable or Disable the Service Processor SSH Service
- To Generate a Host Public Key for SSH Service

Note – You can use the `setupplatform`(8) command rather than the following procedures to perform network installation tasks. For more information, see the `setupplatform`(8) man page.

▼ To Configure the DSCP Network

1. **Log in to the XSCF console with `platadm` or `fieldeng` privileges.**
2. **Type the `setdscp` command.**

   You can use one of two methods, as follows:

- Use the `setdscp` command with the `-y -i` *address* `-m` *netmask* options:

```
XSCF> setdscp -y -i address -m netmask
```

For example:

```
XSCF> setdscp -y -i 10.1.1.0 -m 255.255.255.0
```

- Use the `setdscp` command with no options (interactive mode).

  You are prompted to enter all the DSCP IP addresses sequentially. A command output example of this interactive mode is:

```
XSCF> setdscp
DSCP network [0.0.0.0] > 10.1.1.0
DSCP netmask [255.0.0.0] > 255.255.255.0
XSCF address [10.1.1.1] > [Enter]
Domain #00 address [10.1.1.2] > [Enter]
Domain #01 address [10.1.1.3] > [Enter]
Domain #02 address [10.1.1.4] > [Enter]
Domain #03 address [10.1.1.5] > [Enter]
Domain #04 address [10.1.1.6] > [Enter]
Domain #05 address [10.1.1.7] > [Enter]
Domain #06 address [10.1.1.8] > [Enter]
Domain #07 address [10.1.1.9] > [Enter]
Domain #08 address [10.1.1.10] > [Enter]
...
Commit these changes to the database (y|n)?
```

   a. **For each prompt, press the `Enter` key to accept the displayed value, or type a new value followed by the `Enter` key.**

   b. **To save your changes, enter `Y`. To cancel the changes, enter `N`.**

3. **Verify the operation with the `showdscp` command.**

▼ To Display DSCP Network Configuration

1. **Log in to the XSCF console with `platadm`, `platop`, or `fieldeng` privileges, or `domainadm`, `domainop`, or `domainmgr` privileges for a specific domain.**

2. **Type the** `showdscp` **command:**

```
XSCF> showdscp
```

Command output example for a DSCP network of 10.1.1.0 and a DSCP netmask of 255.255.255.0 is:

```
XSCF> showdscp
DSCP Configuration:
Network: 10.1.1.0
Netmask: 255.255.255.0

Location     Address
XSCF         10.1.1.1
Domain #00   10.1.1.2
Domain #01   10.1.1.3
Domain #02   10.1.1.4
Domain #03   10.1.1.5
...
```

▼ To Configure the XSCF Network Interfaces

Settings to configure the XSCF network must be applied to XSCF, and the Service Processor must be reset, before the settings become effective. See "To Set Or Reset the XSCF Network" on page 34.

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Type the** `setnetwork` **command:**
   a. **To set the network interface, netmask, and IP address:**

```
XSCF> setnetwork interface [-m addr] address
```

where *interface* specifies the network interface to be set, -m *addr* specifies the netmask address of the network interface, and *address* specifies the IP address of the network interface. If the `-m` option is omitted, the netmask corresponding to the IP address is set. See TABLE 3-1 for valid interface names.

The following example sets the IP address and netmask for the interface XSCF-LAN#0 on XSCF Unit 1 in a high-end server:

```
XSCF> setnetwork xscf#1-lan#0 -m 255.255.255.0 192.168.11.10
```

b. To enable the specified network interface:

```
XSCF> setnetwork -c [up|down] interface
```

where -c specifies whether to enable or disable the specified network interface, and *interface* specifies the network interface to be enabled.

Note – When the XSCF unit is configured with redundancy, ISN addresses must be in the same network subnet.

For additional information on the setnetwork command, including specifying takeover IP addresses, see the setnetwork(8) man page or to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

3. **Verify the operation with the** shownetwork **command.**

▼ To Configure the XSCF Network Route Information

Settings to configure the XSCF network must be applied to XSCF, and the Service Processor must be reset, before the settings become effective. See "To Set Or Reset the XSCF Network" on page 34.

1. **Log in to the XSCF console with** platadm **privileges.**

2. **Type the** setroute **command:**

```
XSCF> setroute -c [add|del] -n address [-m address] [-g address] interface
```

where -c specifies whether to add or delete routing information, -n *address* specifies the IP address to which routing information is forwarded, -m *address* specifies the netmask address to which routing information is forwarded, -g *address* specifies the gateway address, and *interface* specifies the network interface to be set with routing information. See TABLE 3-1 for valid interface names.

For additional information on the setroute command, including specifying takeover IP addresses, see the setroute(8) man page or to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

▼ To Set Or Reset the XSCF Network

When you set or change the Service Processor host name, DNS domain name, DNS server, IP address, netmask, or routing information, the settings must be applied to XSCF, and the Service Processor must be reset, before the settings become effective.

1. **Log in to the XSCF console with** `platadm` **privileges.**

2. **Type the** `applynetwork` **command:**

```
XSCF> applynetwork
```

   The `applynetwork` command displays the information that has been set for the XSCF network, and asks you to apply the settings.

3. **Execute the** `rebootxscf` **command to make the settings effective:**

```
XSCF> rebootxscf
```

4. **Verify the operation with the** `shownetwork` **command.**

▼ To Display XSCF Network Configuration

1. **Log in to the XSCF console.**

2. **Type the** `shownetwork` **command:**

```
XSCF> shownetwork -a | interface
```

   where `-a` displays information for all XSCF network interfaces, and *interface* displays information for a specific XSCF network interface name, in the format `xscf#`*x*`-`*y*.

   Command output example for the XSCF Unit #0, LAN#1 is:

```
XSCF> shownetwork xscf#0-lan#1
Link encap:Ethernet HWaddr 00:00:00:12:34:56
inet addr:192.168.10.11 Bcast:192.168.10.255 Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
...
```

▼ To Set the Service Processor Host Name and DNS Domain Name

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Type the** `sethostname` **command:**
   a. **To set the Service Processor host name:**

```
XSCF> sethostname xscfu hostname
```

   where *xscfu* can be `xscf#0` (XSCF Unit 0) or `xscf#1` (XSCF Unit 1 in a high-end server); *hostname* is the host name to be set for the specified Service Processor (XSCF Unit).

   b. **To set the Service Processor domain name:**

```
XSCF> sethostname -d domainname
```

3. **To verify the operation, type the** `showhostname` **command.**

```
XSCF> showhostname -a | xscfu
```

   where `-a` displays the host names for all XSCF Units, and *xscfu* displays information for a specific XSCF Unit, either `xscf#0` or `xscf#1`.

▼ To Set the Service Processor's DNS Name Server

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Type the** `setnameserver` **command, followed by one or more IP addresses separated by a comma:**

```
XSCF> setnameserver ip_address
```

3. **To verify the operation, type the** `shownameserver` **command.**

```
XSCF> shownameserver
```

▼ To Enable or Disable Use of an LDAP Server for Authentication and Privilege Lookup

1. **Log in to the XSCF console with** `useradm` **privileges.**

2. **Type the** `setlookup` **command:**

```
XSCF> setlookup -a local|ldap
XSCF> setlookup -p local|ldap
```

   The `-a` option sets the authentication lookup to either local or in LDAP; the `-p` option sets the privileges lookup to either local or in LDAP. When `local` is specified, lookup is only done locally; when `ldap` is specified, lookup is first done locally, then in LDAP if not found locally.

3. **To verify the operation, type the** `showlookup` **command.**

```
XSCF> showlookup
```

▼ To Configure the XSCF as an LDAP Client

Make sure you have added an LDAP privileges schema to the LDAP server, and attributes for each user on the LDAP server. See CODE EXAMPLE 3-1 and CODE EXAMPLE 3-2 for information.

1. **Log in to the XSCF console with** `useradm` **privileges.**

2. **Type the** `setldap` **command:**

```
XSCF> setldap [-b bind] [-B baseDN] [-c certchain] [-p] [-s servers] [-
t user] -T timeout
```

   where *bind* is the bind name, *baseDN* is the base Distinguished Name, *certchain* is an LDAP server certificate chain, `-p` sets the password to use when binding to the LDAP server (you are prompted for the password), *servers* sets the primary and secondary LDAP servers and ports, *user* tests the server connection and password for the specified user, and *timeout* is the maximum amount of time allowed for an LDAP search before search results are returned. For more information on LDAP, see the `setldap`(8) `man` page, to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*, and to the Solaris OS documentation collection.

3. **To verify the operation, type the** `showldap` **command.**

```
XSCF> showldap
```

▼ To Configure the XSCF as an NTP Client

If you are using NTP, an `ntp.conf` file must be created on the domains. See "Time Synchronization and NTP Service" on page 25 for information. This section describes how to set the XSCF as an NTP client.

1. **Log in to the XSCF console with `platadm` privileges.**
2. **Type the `setntp` command:**

```
XSCF> setntp -c add address
```

   where *address* is the IP address of the NTP server.

3. **Reset the Service Processor with the `rebootxscf` command to make the settings effective:**

```
XSCF> rebootxscf
```

4. **To verify the operation, type the `shownt p` command.**

```
XSCF> showntp -a
```

▼ To Configure the XSCF as an NTP Server

If you are using NTP, an `ntp.conf` file must be created on the domains. See "Time Synchronization and NTP Service" on page 25 for information. This section describes how to set the XSCF as an NTP server.

Note – Check the Product Notes for your server, which may contain important information about using the XSCF as NTP server.

---

1. **Log in to the XSCF console with `platadm` privileges.**
2. **Type the `setntp` command:**

```
XSCF> setntp -c stratum -i stratum_no
```

   where *stratum_no* is the stratum value for the NTP server. The default value is 5.

3. **Reset the Service Processor with the `rebootxscf` command to make the settings effective:**

```
XSCF> rebootxscf
```

4. **To verify the operation, type the** `showntp` **command.**

```
XSCF> showntp -s
```

▼ To Display the NTP Configuration

1. **Log in to the XSCF console.**
2. **Type the** `showntp` **command:**

```
XSCF> showntp {-a | -l | address | -s}
```

where the `-a` option displays all the NTP servers configured for use, the `-l` option displays time synchronization information, *address* is the IP address of the NTP server for which information is to be displayed, and the `-s` option displays the stratum value of the NTP server.

▼ To Set the Timezone, Daylight Saving Time, Date, and Time Locally on the Service Processor

1. **Log in to the XSCF console with** `platadm` **or** `fieldeng` **privileges.**
2. **Type the** `settimezone` **command:**

   a. **To display the timezones that you can set:**

```
XSCF> settimezone -c settz -a
```

   b. **To set the timezone:**

```
XSCF> settimezone -c settz -s timezone
```

where *timezone* is the timezone you want to set. For more information on the `settimezone` command, including setting Daylight Saving Time, see the `settimezone`(8) `man` page or to the *Reference Manual.*

3. **To verify the operation, type the** `showtimezone` **command.**

```
XSCF> showtimezone
```

4. **Type the** `setdate` **command:**

```
XSCF> setdate -s date
```

where *date* is the date and time you want to set. For more information on the `setdate` command, see the `setdate`(8) `man` page or to the *Reference Manual.*

5. **After specifying the date, you are prompted to reset the Service Processor, so that the date and time become effective. Type** `Y` **to reset the Service Processor.**

6. **To verify the operation, type the** `showdate` **command.**

```
XSCF> showdate
```

▼ To Create a USM User Known to the SNMP Agent

A USM user known to the SNMP agent is not required to have a regular user account on the Service Processor.

1. **Log in to the XSCF console with** `platadm` **privileges.**

2. **Type the** `setsnmpusm` **command.**

You can use one of two methods to add USM users, as follows:

- To add a new user, use the `create` argument:

```
XSCF> setsnmpusm create -a authentication_protocol [-p authentication_password]
[-e encryption_password] user
```

where *authentication_protocol* is either MD5 or SHA, *authentication_password* is the authentication password (must be equal to or greater than 8 characters), *encryption_password* is the encryption password, and *user* is the user name to be known to the agent for subsequent SNMP communication. If you do not specify the passwords, you are prompted to enter them.

- To add a new user with the same settings as an existing user, use the `clone` argument:

```
XSCF> setsnmpusm clone -u clone_user user
```

where *clone_user* is a valid user name known to the SNMP agent, and *user* is the user name to be created with the same settings as the valid *clone_user*. Use the `setsnmpusm password` command to change either or both passwords for the cloned user, if desired.

3. **To verify the operation, type the** `showsnmpusm` **command.**

▼ To Display USM Information for the SNMP Agent

1. **Log in to the XSCF console with** `platadm` **or** `platop` **privileges.**
2. **Type the** `showsnmpusm` **command:**

```
XSCF> showsnmpusm
```

Command output example is:

```
XSCF> showsnmpusm

Username        Auth Protocol
=============   =============
jsmith           SHA
sue              MD5
```

▼ To Create a VACM Group

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Type the** `setsnmpvacm` **command:**

```
XSCF> setsnmpvacm creategroup -u username groupname
```

where *username* is a valid user name known to the SNMP agent, and *groupname* is the name of the group to create for the specified user for view access.

3. **To verify the operation, type the** `showsnmpvacm` **command.**

▼ To Create a VACM View

1. **Log in to the XSCF console with** `platadm` **privileges.**

2. **Type the** `setsnmpvacm` **command:**

```
XSCF> setsnmpvacm createview -s OID_subtree [-m OID_Mask] viewname
```

where *OID_subtree* is the MIB OID subtree for the view (values start at .1 for the entire MIB tree, and can be limited to certain portions of the tree by using the optional *OID_Mask*), and *viewname* is the name of the view to create for the SNMP agent exported MIB information. View access is read-only for the agent.

3. **To verify the operation, type the** `showsnmpvacm` **command.**

▼ To Give a VACM Group Access to a VACM View

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Type the** `setsnmpvacm` **command:**

```
XSCF> setsnmpvacm createaccess -r viewname groupname
```

where *viewname* is a valid SNMP agent view, and *groupname* is a valid SNMP agent group name.

3. **To verify the operation, type the** `showsnmpvacm` **command.**

▼ To Display VACM Information for the SNMP Agent

1. **Log in to the XSCF console with** `platadm` **or** `platop` **privileges.**

2. **Type the** `showsnmpvacm` **command:**

```
XSCF> showsnmpvacm
```

Command output example is:

```
XSCF> showsnmpvacm

Groups

Groupname       Username
=============   =============
admin           jsmith, bob

Views

View            Subtree          Mask       Type
=============   =======          ======     =========
all_view        .1               ff         include

Access

View            Group
=============   =============
all_view        admin
```

▼ To Configure the SNMP Agent to Send Version 3 Traps to Hosts

1. **Log in to the XSCF console with** `platadm` **privileges.**

2. **Type the** `setsnmp` **command:**

```
XSCF> setsnmp addv3traphost -u username -r authentication_protocol {-n
engine_id | -i} [-a authentication_password] [-e encryption_password] [-p
trap_port] traphost
```

where *username* is a user known to the SNMP agent, *authentication_protocol* is either MD5 or SHA, *engine_id* is the identifier of the local agent sending the trap, which must match the *engine_id* expected by the host, `-i` asks for acknowledgement from the receiving host, *authentication_password* is the authentication password (must be equal to or greater than 8 characters),

encryption_password is the encryption password, *trap_port* is the listening port for the SNMP agent (the default is 161), and *traphost* is the host name where the SNMP manager application is running.

If you do not specify the passwords, you are prompted to enter them.

3. **To verify the operation, type the** `showsnmp` **command.**

For additional options with the `setsnmp` command, including information on configuring your system to accept SNMP version 1 or 2 traps, see the `setsnmp`(8) `man` page.

▼ To Enable the SNMP Agent

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Type the** `setsnmp` **command:**

```
XSCF> setsnmp enable
```

3. **To verify the operation, type the** `showsnmp` **command.**

Make sure that your SNMP manager application can communicate with the Service Processor SNMP agent based on the configuration you used for the agent, namely, user, port, and trap information.

▼ To Display SNMP Agent Configuration

1. **Log in to the XSCF console with** `platadm` **or** `platop` **privileges.**

2. **Type the** `showsnmp` **command:**

```
XSCF> showsnmp
```

Command output example is:

```
XSCF> showsnmp

Agent Status:       Enabled
Agent Port:         161
System Location:    Unknown
System Contact:     Unknown
System Description: Unknown

Trap Hosts:

Hostname   Port    Type   Community String  Username  Auth Protocol
--------   ----    ----   ----------------  --------  ------------
host1       162      v3     n/a             user1     SHA

SNMP V1/V2c:         None
```

▼ To Enable or Disable the Service Processor HTTPS Service

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Optionally, display the current status of the Service Processor HTTPS Service:**

```
XSCF> showhttps
```

3. **Type the** `sethttps` **command:**

```
XSCF> sethttps -c function
```

where *function* is either `enable` or `disable`. The HTTPS service starts immediately after being enabled, and stops immediately after being disabled.

For additional options with the `sethttps` command, including information on certificates and private keys, see the `sethttps`(8) `man` page or to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

▼ To Enable or Disable the Service Processor Telnet Service

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Optionally, display the current status of the Service Processor Telnet Service:**

```
XSCF> showtelnet
```

3. **Type the** `settelnet` **command:**

```
XSCF> settelnet -c function
```

where *function* is either `enable` or `disable`. The Telnet service starts immediately after being enabled, and stops immediately after being disabled.

▼ To Configure the Service Processor SMTP Service

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Optionally, display the current status of the Service Processor SMTP Service:**

```
XSCF> showsmtp
```

3. **Type the** `setsmtp` **command:**

```
XSCF> setsmtp
```

You are prompted to enter the name of the SMTP mail server to be used, the port number to be used (default is port 25), the authentication mechanism (default is `none`) and the Reply Address. You must specify a valid email address.

▼ To Enable or Disable the Service Processor SSH Service

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Optionally, display the current status of the Service Processor SSH Service:**

```
XSCF> showssh
```

3. **Type the** `setssh` **command:**

```
XSCF> setssh -c function
```

where *function* is either `enable` or `disable`. You must generate a host public key to use SSH.

▼ To Generate a Host Public Key for SSH Service

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Type the** `setssh` **command:**

```
XSCF> setssh -c genhostkey
```

For additional options with the `setssh` command, including information on adding or deleting user public keys, see the `setssh`(8) `man` page or to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

▼ To Set the Altitude on the Service Processor

1. **Log in to the XSCF console with** `fieldeng` **privileges.**
2. **Type the** `setaltitude` **command:**

```
XSCF> setaltitude -s altitude=value
```

where *value* is a unit of meters. The unit of meters is rounded off to the nearest hundred meters.

3. **To verify the operation, type the** `showaltitude` **command.**

Related Information

For additional information on this chapter's topics, see:

Resource	Information
`man` pages	`showdscp`(8), `setdscp`(8), `showloginlockout`(8), `setloginlockout`(8), `shownetwork`(8), `setnetwork`(8), `applynetwork`(8), `showhostname`(8), `sethostname`(8), `setroute`(8), `showroute`(8), `setdate`(8), `showdate`(8), `shownтp`(8), `setntp`(8), `xntpd`(1M), `ntpq`(1M), `ntpdate`(1M), `setnameserver`(8), `shownameserver`(8), `sethostname`(8), `showhostname`(8), `showlookup`(8), `setlookup`(8), `showldap`(8), `setldap`(8), `showsnmp`(8), `setsnmp`(8), `setsnmpusm`(8), `setsnmpvacm`(8), `showsnmpusm`(8), `showsnmpvacm`(8), `showhttps`(8), `sethttps`(8), `showtelnet`(8), `settelnet`(8), `showssh`(8), `setssh`(8), `showsmtp`(8), `setsmtp`(8), `setaltitude`(8), `showaltitude`(8), `rebootxscf`(8), `dumpconfig`(8), `restoreconfig`(8)
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide	Topics covered in this chapter and additional information on day-to-day administration
Solaris System Management Agent Administration Guide	SNMP

CHAPTER 4

Domain Configuration

This chapter describes how to set up and manage domains with XSCF firmware. On your server, by default from the factory, there is one domain with the Solaris OS installed, and its Domain Identification Number (DID) is 0 (zero).

This chapter contains these sections:

- About Domains
- XSCF Shell Procedures for Domain Configuration
- Related Information

About Domains

These sections provide details on domain configuration:

- Domains and System Boards
- SPARC64 VI and SPARC64 VII Processors and CPU Operational Modes
- Domain Resource Assignment
- Domain Component List and Logical System Boards
- Overview of Steps for Domain Configuration
- Domain Configuration Example
- Domain Communication
- CD-RW/DVD-RW Drive or Tape Drive Assignment
- Backup and Restore Operations
- Dynamic Reconfiguration

Domains and System Boards

A domain is an independent system resource that runs its own copy of the Solaris OS. Domains divide a system's total resources into separate units that are not affected by each other's operations. Domains can be used for different types of processing; for example, one domain can be used to test new applications, while another domain can be used for production purposes.

The entry-level server supports only a single domain, one CPU, 8 dual inline memory modules (DIMMs), and I/O. Midrange and high-end servers support multiple domains and one to 16 physical system boards (PSBs). One PSB consists of 4 CPUs, 32 DIMMs, and I/O. The I/O varies by server, and can include PCIe slots, PCI-X slots, and built-in I/O.

Entry-level servers have a fixed system board configuration by default; you do not need to reconfigure the system board.

To use a PSB in your midrange or high-end server, the hardware resources on the board must be logically divided and reconfigured as eXtended System Boards (XSBs). There are two modes of XSBs:

- Uni-XSB
  - A PSB logically undivided and configured into one XSB
  - Contains all the resources on the board: 4 CPUs, 32 DIMMs, and I/O on a midrange and high-end server; 1 CPU, 8 DIMMs, and I/O on an entry-level server.

The following figures show a PSB in Uni-XSB mode on entry-level, midrange, and high-end servers.

Note – On midrange and high-end servers, the CPU modules and memory modules are known as the CPU/memory board unit (CMU), and the I/O devices are contained in the I/O unit (IOU). The terms CMU and IOU do not have meaning for entry-level servers.

FIGURE 4-1 A Physical System Board in Uni-XSB Mode on an Entry-Level Server

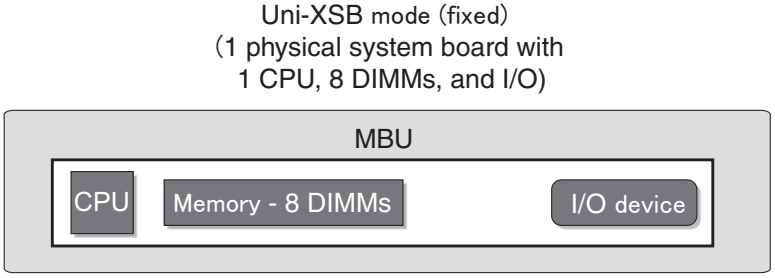


FIGURE 4-2 A Physical System Board in Uni-XSB Mode on a Midrange Server

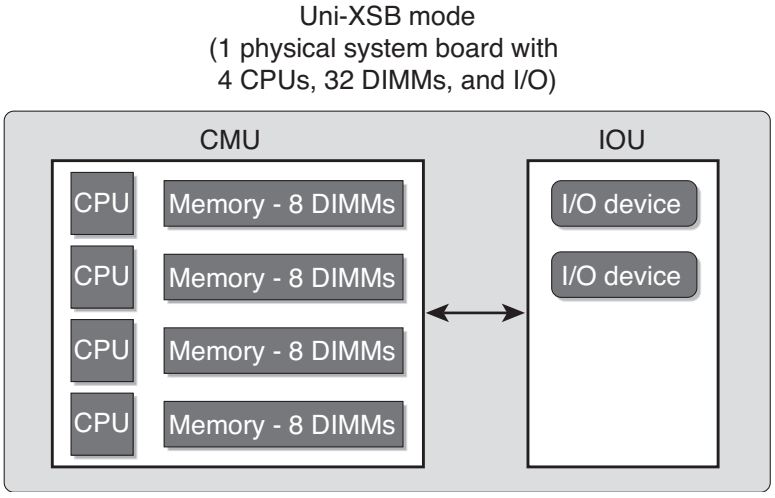
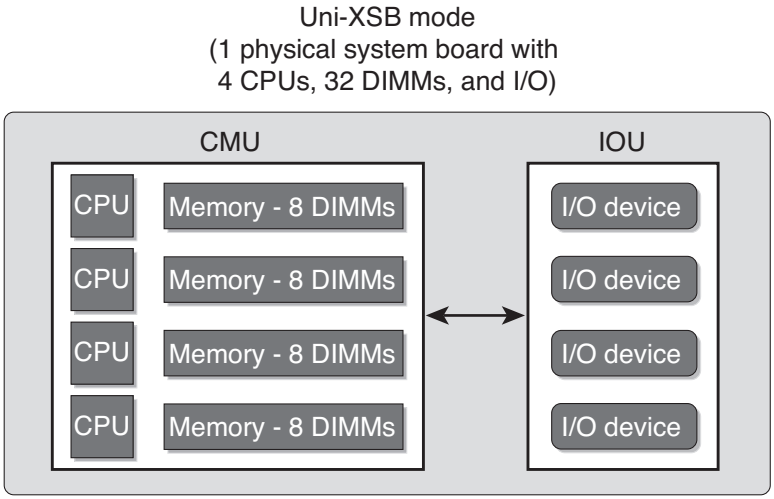


FIGURE 4-3 A Physical System Board in Uni-XSB Mode on a High-End Server



- Quad-XSB (midrange and high-end servers only)
  - A PSB logically divided and configured into four XSBs
  - Each of the four XSBs contains one-quarter of the total board resources: 1 CPU, 8 DIMMs, and I/O. On a midrange server, only two XSBs have I/O.

Note – Although a CMU with two CPUs can be configured into Quad-XSB mode on a high-end server, the server generates a "configuration error" message for those XSBs that do not have a CPU and memory.

FIGURE 4-4 shows a PSB in Quad-XSB mode on a midrange server, and FIGURE 4-5 shows a PSB in Quad-XSB mode on a high-end server.

The logical dividing between Uni-XSB and Quad-XSB is done using the `setupfru` command.

FIGURE 4-4 A Physical System Board in Quad-XSB Mode on a Midrange Server

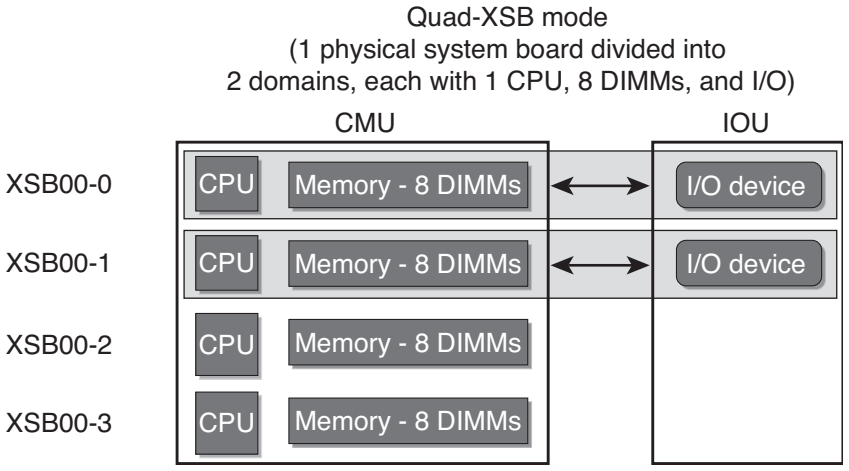
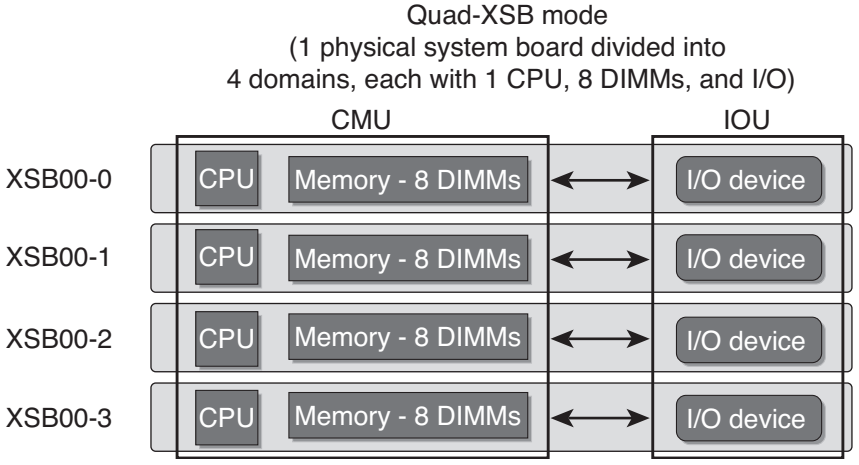


FIGURE 4-5 A Physical System Board in Quad-XSB Mode on a High-End Server



A domain consists of one or more XSBs. Each domain runs its own copy of the Solaris OS. A domain must have, at a minimum, 1 CPU, 8 DIMMs, and I/O.

In FIGURE 4-4, one domain (for example, domain 0) must contain XSB 00-0, and the second domain (for example, domain 1) must contain XSB 00-1, because of the I/O requirement for a domain. The remaining XSB 00-2 and XSB 00-3 can be assigned to either domain, or to none.

The number of domains allowed depends on server model. The default is one domain (the maximum for entry-level servers) and the maximum number of domains is 24. Each domain is identified with a domain ID number, with the default domain as #0.

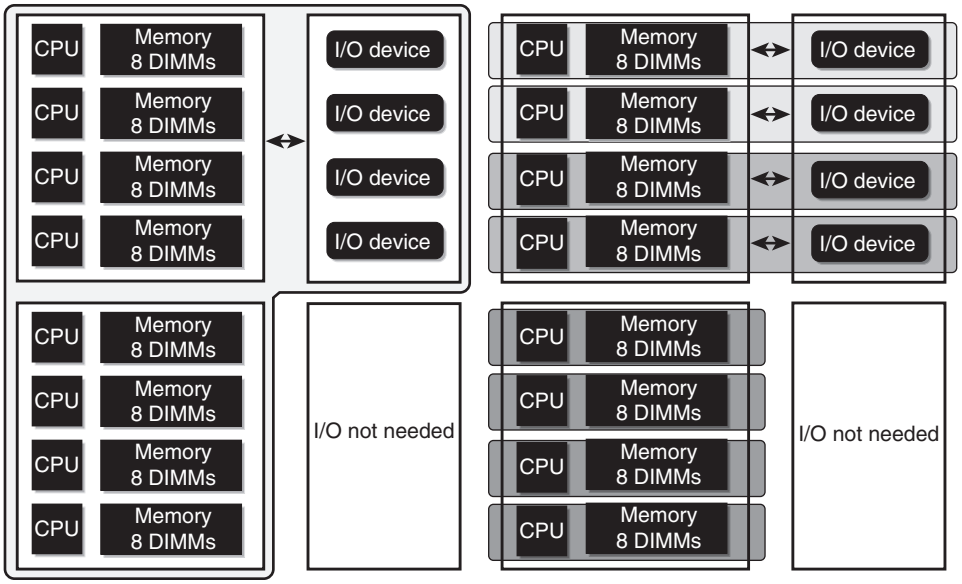
TABLE 4-1 shows the maximum number of system boards, the maximum number of domains, and the domain ID number range by server model.

TABLE 4-1 Boards, Domains, and Domain ID Numbers

Server Model	Maximum Physical System Boards	Maximum Domains	Domain ID Number Range
M9000 + expansion unit	16	24	0-23
M9000	8	24	0-23
M8000	4	16	0-15
M5000	2	4	0-3
M4000	1	2	0-1
M3000	1	1	0

Domains can be set up to include both Uni-XSBs and Quad-XSBs. FIGURE 4-6 shows two XSBs in Uni-XSB mode (left side of figure) and two XSBs in Quad-XSB mode (right side of figure) on a high-end server; the partition of these boards into three Solaris domains is shown by shading.

FIGURE 4-6 Example of XSBs and Solaris Domains on a High-End Server



The Solaris OS is installed on a per-domain basis. In the configuration shown in FIGURE 4-6, there would be three Solaris images, one for each domain.

In high-end servers, the internal disks are available only for the first (top) I/O device and the third (third from top) I/O device. The second and fourth I/O devices do not have the capability to have internal hard disks. In midrange servers, the internal disk is available only for the first (top) I/O device.

SPARC64 VI and SPARC64 VII Processors and CPU Operational Modes

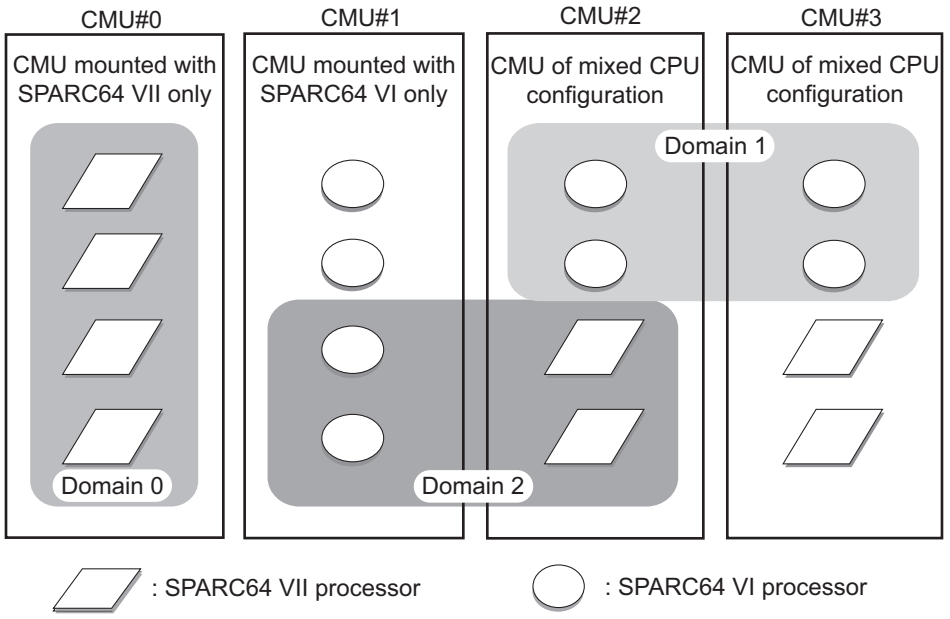
Midrange and high-end servers support system boards that contain SPARC64™ VI processors, SPARC64 VII processors, or a mix of the two processor types. Entry-level servers support only SPARC64 VII processors.

Note – On midrange and high-end servers, SPARC64 VII processors run only with certain versions the Solaris OS and XCP firmware (beginning with XCP 1070). For specific information about minimum OS and firmware requirements, see the *Product Notes* (no earlier than the XCP 1070 edition) for your server.

The first firmware to support the newer entry-level server is the XCP 1080 firmware. For specific information about minimum OS requirements, see the *Product Notes* for your server.

FIGURE 4-7 shows an example of a mixed configuration of SPARC64 VI and SPARC64 VII processors.

FIGURE 4-7 CPUs on CPU/Memory Board Unit (CMU) and Domain Configuration



A mix of SPARC64 VI and SPARC64 VII processors can be mounted on a single CMU, as shown in CMU#2 and CMU#3 in FIGURE 4-7. And a single domain can be configured with a mix of these SPARC64 processors, as shown in Domain 2 in FIGURE 4-7.

CPU Operational Modes

A domain runs in one of the following CPU operational modes:

- SPARC64 VI Compatible Mode (for midrange and high-end servers only) – All processors in the domain – which can be SPARC64 VI processors, SPARC64 VII processors, or any combination of them – behave like and are treated by the OS as SPARC64 VI processors. The extended capabilities of SPARC64 VII processors are not available in this mode. Domains 1 and 2 in FIGURE 4-7 correspond to this mode.
- SPARC64 VII Enhanced Mode (for entry-level, midrange, and high-end servers) – All boards in the domain must contain only SPARC64 VII processors. In this mode, the server utilizes the new features of these processors. Domain 0 in FIGURE 4-7 corresponds to this mode.

To check the CPU operational mode, execute the `prtdiag` (1M) command on the Solaris OS. If the domain is in SPARC64 VII Enhanced Mode, the output will display `SPARC64-VII` on the `System Processor Mode` line. If the domain is in SPARC64 VI Compatible Mode, nothing is displayed on that line.

By default, the Solaris OS automatically sets a domain's CPU operational mode each time the domain is booted based on the types of processors it contains. It does this when the `cpumode` variable – which can be viewed or changed by using the `setdomainmode`(8) command – is set to `auto`.

You can override the above process by using the `setdomainmode`(8) command to change the `cpumode` from `auto` to `compatible`, which forces the Solaris OS to set the CPU operational mode to SPARC64 VI Compatible Mode on reboot. To do so, power off the domain, execute the `setdomainmode`(8) command to change the `cpumode` setting from `auto` to `compatible`, then reboot the domain.

DR operations work normally on midrange and high-end server domains running in SPARC64 VI Compatible Mode. You can use DR to add, delete or move boards with either or both processor types, which are all treated as if they are SPARC64 VI processors. Entry-level servers do not support DR operations.

DR also operates normally on domains running in SPARC64 VII Enhanced Mode, with one exception: You cannot use DR to add or move into the domain a system board that contains any SPARC64 VI processors. To add a SPARC64 VI processor you must power off the domain, change it to SPARC64 VI Compatible Mode, then reboot the domain.

In an exception to the above rule, you can use the DR `addboard`(8) command with its `-c reserve` or `-c assign` option to reserve or register a board with one or more SPARC64 VI processors in a domain running in SPARC64 VII Enhanced Mode. The next time the domain is powered off then rebooted, it comes up running in SPARC64 VI Compatible Mode and can accept the reserved or registered board.

Note – Change the `cpumode` from `auto` to `compatible` for any domain that has or is expected to have a mix of processor types. If you leave the domain in `auto` mode and all the SPARC64 VI processors later fail, the OS will see only the SPARC64 VII processors – because the failed SPARC64 VI processors will have been degraded – and it will reboot the domain in SPARC64 VII Enhanced Mode. You will be able to use DR to delete the bad SPARC64 VI boards so you can remove them. But you will not be able to use DR to add replacement or repaired SPARC64 VI boards until you change the domain from SPARC64 VII Enhanced Mode to SPARC64 VI Compatible mode, which requires a reboot.

Setting `cpumode` to `compatible` in advance enables you to avoid possible failure of a later DR add operation and one or more reboots.

The *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* contains the above information, as well as additional detailed instructions.

Domain Resource Assignment

The assignment of CPU modules (CPUM), memory, and I/O to domains in Quad-XSB mode for midrange and high-end servers is shown in TABLE 4-2, TABLE 4-3 and TABLE 4-4.

TABLE 4-2 Resource Assignment in Quad-XSB Mode on an M4000 Midrange Server

XSB	CPU	Memory Board	I/O
00-0	CPUM#0-CHIP#0	MEMB#0	Disks; GbE; PCI#0, PCI#1, PCI#2
00-1	CPUM#0-CHIP#1	MEMB#1	PCI#3, PCI#4
00-2	CPUM#1-CHIP#0	MEMB#2	None
00-3	CPUM#1-CHIP#1	MEMB#3	None

TABLE 4-3 Resource Assignment in Quad-XSB Mode on an M5000 Midrange Server

XSB	CPU	Memory Board	I/O
00-0	CPUM#0-CHIP#0	MEMB#0	Disks; GbE; IOU#0-PCI#0, IOU#0-PCI#1, IOU#0-PCI#2
00-1	CPUM#0-CHIP#1	MEMB#1	IOU#0-PCI#3, IOU#0-PCI#4
00-2	CPUM#1-CHIP#0	MEMB#2	None
00-3	CPUM#1-CHIP#1	MEMB#3	None
01-0	CPUM#2-CHIP#0	MEMB#4	Disks; GbE; IOU#1-PCI#0, IOU#1-PCI#1, IOU#1-PCI#2
01-1	CPUM#2-CHIP#1	MEMB#5	IOU#1-PCI#3, IOU#1-PCI#4
01-2	CPUM#3-CHIP#0	MEMB#6	None
01-3	CPUM#3-CHIP#1	MEMB#7	None

In TABLE 4-4, the XSB board number xx is in the range of 00-15; the IOU board number xx is the IOU board number corresponding to the XSB board number. For example, XSB 00-0 has IOU#00-PCI#0.

TABLE 4-4 Resource Assignment in Quad-XSB Mode on a High-end Server

XSB	CPU	DIMMs	I/O
xx-0	CPUM#0	MEM#00A,B MEM#01A,B MEM#02A,B MEM#03A,B	IOU#*xx*-PCI#0, IOU#*xx*-PCI#1

TABLE 4-4 Resource Assignment in Quad-XSB Mode on a High-end Server *(Continued)*

XSB	CPU	DIMMs	I/O
xx-1	CPUM#1	MEM#10A,B MEM#11A,B MEM#12A,B MEM#13A,B	IOU#*xx*-PCI#2, IOU#*xx*-PCI#3
xx-2	CPUM#2	MEM#20A,B MEM#21A,B MEM#22A,B MEM#23A,B	IOU#*xx*-PCI#4, IOU#*xx*-PCI#5
xx-3	CPUM#3	MEM#30A,B MEM#31A,B MEM#32A,B MEM#33A,B	IOU#*xx*-PCI#6, IOU#*xx*-PCI#7

Domain Component List and Logical System Boards

The domain component list (DCL) identifies the *potential* resources for a domain. On midrange or high-end servers, a single XSB can potentially belong to multiple domains. However, a single XSB can be *assigned* only to one specific domain. Entry-level servers are configured with one XSB and one domain, and the XSB is already configured in the domain.

XSB numbers are not used in domain configuration, however. The software requires that each XSB number "map" to a *logical system board* (LSB) number. Processor numbers and I/O bridges are based on LSB numbers. Appendix A contains additional information on LSB and device path names. Note that on entry-level servers, which have only one XSB, the LSB number is 0 by default.

Overview of Steps for Domain Configuration

This section applies to domain configuration after installing a new board in the midrange or high-end server.

Note – If you create a new domain, you have to install the Solaris OS on the domain. See the Solaris OS documentation collection for instructions.

Domain configuration typically includes these steps:

1. Logging in to the XSCF console with appropriate privileges.
2. Specifying the XSB mode, either Uni-XSB or Quad-XSB, using the `setupfru` command.
3. Setting up information for a domain (the DCL), using the `setdcl` command. The DCL identifies the potential resources for a domain.
4. Assigning the hardware resources (XSBs) to the domain, using the `addboard` command. The DCL must be set up before assigning XSBs to a domain.
5. Powering on the domain, using the `poweron` command.

   (Step 5 and Step 6 may be done in reverse order.)
6. Opening a console to the domain, using the `console` command.
7. Installing the Solaris OS at the OpenBoot PROM prompt, if this is a new domain. See the Solaris OS documentation collection for instructions.
8. Setting up any services you want to use on the domain, such as NTP. See Chapter 3 for information on services, including NTP.

Domain Configuration Example

This domain configuration example, applicable to midrange and high-end servers, assumes one PSB in Uni-XSB mode will be set up in Quad-XSB mode and configured into two domains. The domain configuration will be:

```
domain0 = XSB#00-0 + XSB#00-2
domain1 = XSB#00-1 + XSB#00-3
```

```
XSCF> setupfru -x 4 sb 0
XSCF> showfru sb 0

Device  Location    XSB Mode        Memory Mirror Mode
sb      00          Quad            no

XSCF> setdcl -d 0 -a 0=00-0
XSCF> setdcl -d 0 -a 1=00-2
XSCF> addboard -c assign -d 0 00-0 00-2

XSB#00-0 will be assigned to DomainID 0. Continue?[y|n] :y
XSB#00-2 will be assigned to DomainID 0. Continue?[y|n] :y

XSCF> showdcl -v -d 0
```

```
DID   LSB   XSB   Status   No-Mem   No-IO    Float    Cfg-policy

00                Powered Off                         FRU
      00    00-0           False    False    False
      01    00-2           False    False    False
      02    -
      03    -
      04    -
      05    -
      06    -
      07    -
      08    -
      09    -
      10    -
      11    -
      12    -
      13    -
      14    -
      15    -

XSCF> poweron -d 0

DomainIDs to power on:0
Continue? [y|n] :y
00 :Powered on

XSCF> setdcl -d 1 -a 0=00-1
XSCF> setdcl -d 1 -a 1=00-3
XSCF> addboard -c assign -d 1 00-1 00-3

XSB#00-1 will be assigned to DomainID 1. Continue?[y|n] :y
XSB#00-3 will be assigned to DomainID 1. Continue?[y|n] :y

XSCF> showdcl -v -d 1

DID   LSB   XSB   Status   No-Mem   No-IO    Float    Cfg-policy

01                Powered Off                         FRU
      00    00-1           False    False    False
      01    00-3           False    False    False
      02    -
      03    -
      04    -
      05    -
      06    -
      07    -
      08    -
      09    -
      10    -
```

```
      11    -
      12    -
      13    -
      14    -
      15    -

XSCF> poweron -d 1

DomainIDs to power on:1
Continue? [y|n] :y
01 :Powered on

XSCF> showboards -a

XSB  DID(LSB) Assignment  Pwr  Conn Conf Test    Fault
---- -------- ----------- ---- ---- ---- ------- -------
00-0 00(00)   Assigned    y    y    n    Passed  Normal
00-1 01(00)   Assigned    y    y    n    Passed  Normal
00-2 00(01)   Assigned    y    y    n    Passed  Normal
00-3 01(01)   Assigned    y    y    n    Passed  Normal

XSCF> console -d 0
Connect to Domain#00?[y|n] :y

{0} ok
```

Domain Communication

Domain communication includes:

- Domain and Service Processor internal communication over the DSCP network
- Accessing a domain console from the Service Processor
- Logging in to a domain using an Ethernet connection

DSCP Network

The DSCP network establishes a link, using IP addresses, between the Service Processor and each domain. This link enables communication between the Service Processor and domains, and the secure transfer of information. Each domain must have its own IP address, and the Service Processor must have its own IP address.

DSCP is optimized to securely exchange control data such as error reports, fault events, and time synchronization, between each domain and the Service Processor.

Accessing a Domain Console From the Service Processor

You can log in to the Service Processor and use the `console` command to access a particular domain.

Once you have access to the domain console, you will get the standard Solaris OS console with associated prompts, based on the configured shell. You will be able to run all of the normal Solaris command-line interface commands. To run Solaris GUI-based commands, however, you must log in to the domain from a remote environment, not through the domain console.

Logging in Directly to a Domain

If your server is networked, you can log into a domain directly using standard Solaris applications, such as `telnet`, `rsh`, and `rlogin`. To ensure a secure connection, use `ssh`.

CD-RW/DVD-RW Drive or Tape Drive Assignment

On an entry-level server, the CD-RW/DVD-RW drive can be used with no special specifications. On a midrange server, the optional CD-RW/DVD-RW drive or tape drive can automatically be used by the domain on PSB/XSB 00-0.

On a high-end server, the CD-RW/DVD-RW drive or tape drive can be used by assigning them to a specific card port on an I/O unit. The devices are assigned to a specific port on an I/O unit using the `cfgdevice` command on the Service Processor, then connected using the `cfgadm` command on the Solaris OS. The CD-RW/DVD-RW drives are read-only.

See "To Attach a CD-RW/DVD-RW Drive or Tape Drive While the Solaris OS Is Running on a High-End Server" on page 68 for instructions. Also, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* or to the `cfgadm`(1M) and `cfgdevice`(8) `man` pages for additional information.

Note – Do not use the CD-RW/DVD-RW drive unit and the tape drive unit at the same time.

Backup and Restore Operations

For domain backup and restore operations, see your backup software documentation for instructions. The Solaris OS documentation collection also contains information on backup and restore operations.

Dynamic Reconfiguration

Dynamic reconfiguration allows you to add PSBs to or remove them from midrange or high-end server domains without stopping the Solaris OS. DR is not supported on entry-level servers. You can use dynamic reconfiguration to redistribute your midrange or high-end server resources by adding or removing system boards as needed or to replace failed system boards with new ones. For more information, see the *SPARC Enterprise M4000/M5000/M8000/M9000 Servers Dynamic Reconfiguration (DR) User's Guide* and the *Service Manual* for your server.

XSCF Shell Procedures for Domain Configuration

This section describes these tasks:

- To Set CPU Operational Mode
- To Specify XSB Mode on a Midrange or High-End Server
- To Set Up a Domain Component List for a Midrange or High-End Server Domain
- To Assign an XSB to a Midrange or High-End Server Domain
- To Power On a Domain
- To Display System Board Status
- To Access a Domain From the XSCF Console
- To Attach a CD-RW/DVD-RW Drive or Tape Drive While the Solaris OS Is Running on a High-End Server
- To Disconnect a CD-RW/DVD-RW Drive or Tape Drive While the Solaris OS Is Running on a High-End Server

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Note – To change configuration of a domain, the target domain must be powered off.

▼ To Set CPU Operational Mode

1. **Log in to the XSCF console with** `platadm` **or** `domainadm` **privileges.**
2. **Execute the** `setdomainmode` **command:**

```
XSCF> setdomainmode -d domain_id -m cpumode=mode
```

where *domain_id* is the domain to which the CPU operational mode is to be specified, and *mode* is `auto`, to automatically determine the CPU operational mode at domain startup, or `compatible`, to set the CPU operational mode to the SPARC64 VI Compatible Mode.

3. **Verify the operation with the** `showdomainmode` **command.**
4. **To check the CPU operational mode currently set to the domain, execute the** `prtdiag`**(1M) command on the Solaris OS.**

```
# prtdiag
```

▼ To Specify XSB Mode on a Midrange or High-End Server

1. **Log in to the XSCF console with** `platadm` **or** `fieldeng` **privileges.**
2. **Execute the** `setupfru` **command:**

```
XSCF> setupfru -x mode sb location
```

where *mode* is either **`1`** to specify a Uni-XSB or **`4`** to specify a Quad-XSB; `sb` specifies the system board device, and *location* is the location of the device, a number from 0-15.

3. **Verify the operation with the** `showfru` **command.**

▼ To Set Up a Domain Component List for a Midrange or High-End Server Domain

1. **Log in to the XSCF console with** `platadm` **privileges.**

2. **Type the** `setdcl` **command:**

```
XSCF> setdcl -d domain_id -a lsb=xsb
```

where *domain_id* is the domain you are setting the DCL for; *lsb* is the LSB number; and *xcb* is the XSB number

3. **Verify the operation with the** `showdcl` **command.**

▼ To Assign an XSB to a Midrange or High-End Server Domain

1. **Log in to the XSCF console with** `platadm` **privileges or** `domainadm` **privileges for a specific domain.**

2. **Type the** `addboard` **command:**

```
XSCF> addboard -c assign -d domain_id xsb
```

where *domain_id* is the domain to which the XSB is to be assigned; *xsb* is the XSB number to be assigned to the domain. For example, to assign XSB00-0 in domain 0, enter:

```
XSCF> addboard -c assign -d 0 00-0
```

Once an XSB has been assigned to a domain, that XSB belongs to that domain until the domain unassigns it.

3. **Verify the operation with the** `showboards -a` **command.**

▼ To Power On a Domain

1. **Log in to the XSCF console with** `platadm` **or** `fieldeng` **privileges or** `domainadm` **or** `domainmgr` **privileges for a specific domain.**

2. **Type the** `poweron` **command:**

```
XSCF> poweron -d domain_id
```

where *domain_id* is the domain you want to power on. Only a user with `platadm` or `fieldeng` privileges can use the `-a` option to turn on power to all domains.

3. **Verify the domain is powered on by opening a console to it, with the `console` command.**

   See "To Access a Domain From the XSCF Console" on page 68.

▼ To Display System Board Status

1. **Log in to the XSCF console with `platadm`, `platop`, or `fieldeng` privileges or `domainadm`, `domainmgr`, or `domainop` privileges for a specific domain.**
2. **Type the `showboards` command:**

```
XSCF> showboards -a
```

▼ To Access a Domain From the XSCF Console

1. **Log in to the XSCF console with `platadm`, `platop`, or `useradm` privileges or `domainadm`, `domainmgr`, or `domainop` privileges for a specific domain.**
2. **Type the `console` command:**

```
XSCF> console -d domain_id
```

   where *domain_id* is the domain you want to access. This command supports both interactive and read-only connections; the default is a read-write connection.

3. **To return to the XSCF console, press the Enter key, then the escape character, then type ".". By default, the escape character is "#".**

```
% #.
XSCF>
```

▼ To Attach a CD-RW/DVD-RW Drive or Tape Drive While the Solaris OS Is Running on a High-End Server

1. **If the volume management daemon (`vold`) is running, stop the daemon:**

```
# /etc/init.d/volmgt stop
```

2. **Log in to the XSCF console with `platadm` privileges.**

3. **Type the** `cfgdevice` **command:**

   a. **To check the status of current drives:**

```
XSCF> cfgdevice -l
```

   b. **To attach a drive:**

```
XSCF> cfgdevice -c attach -p port_no
```

   where *port_no* is the port number in the specified domain where the device is to be attached. *port_no* is specified in the format: *IOU number-PCI slot numbe*r.

4. **Mount the drive by typing the** `cfgadm` **command:**

```
# cfgadm -c configure Ap_Id
```

   where *Ap_Id* is the attachment point of the controller, for example, `c0`.

5. **Restart the volume management daemon (**`vold`**) if necessary:**

```
# /etc/init.d/volmgt start
```

▼ To Disconnect a CD-RW/DVD-RW Drive or Tape Drive While the Solaris OS Is Running on a High-End Server

1. **If the volume management daemon (**`vold`**) is running, stop the daemon:**

```
# /etc/init.d/volmgt stop
```

2. **Detach the drive by typing the** `cfgadm` **command:**

```
# cfgadm -c unconfigure Ap_Id
```

   where *Ap_Id* is the attachment point of the controller. For example, if the drive is connected to controller `c0`, you would type:

```
# cfgadm -c unconfigure c0::dsk/c0t4d0
# cfgadm -c unconfigure c0::rmt/0
```

3. **Log in to the XSCF console with** `platadm` **privileges.**

4. **Type the `cfgdevice` command:**

   a. **To check the status of current drives:**

```
XSCF> cfgdevice -l
```

   b. **To detach a drive:**

```
XSCF> cfgdevice -f -c detach -p port_no
```

   where *port_no* is the port number in the specified domain where the device is to be detached. *port_no* is specified in the format: *IOU number-PCI slot number*.

5. **Restart the volume management daemon (`vold`) if necessary:**

```
# /etc/init.d/volmgt start
```

Related Information

For additional information on this chapter's topics, see:

Resource	Information
`man` pages	`setupfru`(8), `showfru`(8), `setdcl`(8), `showdcl`(8), `addboard`(8), `moveboard`(8), `deleteboard`(8), `showboards`(8), `xntpd`(1M), `showdevices`(8), `showconsolepath`(8), `console`(8), `sendbreak`(8), `poweron`(8), `poweroff`(8), `reset`(8), `cfgdevice`(8), `cfgadm`(1M), `setdomainmode`(8)
Solaris OS documentation collection	Solaris OS installation; NTP; domains; backup operations
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide	Domains
SPARC Enterprise M4000/M5000/M8000/M9000 Dynamic Reconfiguration (DR) User's Guide	Domains
Service Manual	Physical component removal; FRUs

CHAPTER 5

Audit Configuration

Entry-level servers can have a single domain, while midrange and high-end servers can run one or multiple domains. Those domains must be as secure as if they were running on physically separate servers. To help ensure that level of security, XSCF firmware provides the audit measures described in this chapter.

This chapter contains these sections:

- About Auditing
- XSCF Shell Procedures for Auditing
- Related Information

About Auditing

The server logs all Service Processor events that could be relevant to security, such as system startup and shutdown, user login and logout, and privilege changes.

An audit record contains information about a single event, what caused it, the time it occurred, and other relevant information. A collection of audit records that are linked is called an audit *trail*. An audit trail can reveal suspicious or abnormal patterns of system behavior, in addition to identifying which user was responsible for a particular event.

Auditing is implemented through:

- Audit Records
- Audit Events
- Audit Classes
- Audit Policy
- Audit File Tools

Audit Records

Audit records are stored in audit files on a 4-megabyte file system on the Service Processor. You cannot change the size reserved for the audit files, but you can transfer the files manually to remote storage at any time. You can also configure auditing for automatic transfers.

Audit files are stored in binary format, although you can export them to XML.

The audit file system switches storage between two partitions. Audit records are stored in one partition until it becomes full, then new records are stored in the other partition. Records in a full partition can be moved to a remote location, according to the audit policy.

If audit policy or network problems impede remote storage, the system generates an alarm. You can clear space by manually transferring the files to remote storage or by deleting them. Until you clear space, new records are dropped.

Because local space is limited to 4 megabytes, the partitions fill up quickly. If you do not configure audit policy to automatically transfer files to remote storage, you will have to intervene frequently or begin to drop records. If you are unable to maintain consistent audit trails, the utility of the audit system is limited. Typically, you either set up sufficient remote space and automatic transfers or disable the audit capability.

Audit Events

Audit events are:

- Changes to the Service Processor configuration, for example, an IP address change
- Any request to perform an operation on an object protected by the access control policy
- All use of authentication
- Tests of password strength, for example, tests done by the `password` command to check whether a password contains enough non alphabetical characters
- Modifications to the access control attributes associated with an object, for example, changes to controls on which domains a board might be in
- Changes made to user security attributes, for example, password or privileges
- Reading information from the audit records (including unsuccessful attempts)
- Modifications to the audit policy
- Actions taken due to the exceeding of a audit trail size threshold
- Actions taken due to audit storage failure
- Modifications made by administrators to the audit trail

- Changes to the time

The minimum data recorded for each event includes:

- Date and time of the event
- Type of event
- Who caused the event
- Outcome of the event (success or failure)

Audit Classes

Audit classes are categories for grouping and sorting audit events. The server provides a predefined set of audit classes, for example, log-in events and service-related events. You cannot define additional audit classes or change the events in a class. See the `setaudit`(8) `man` page for a list of audit classes.

Audit Policy

Audit policy determines how the auditing feature is implemented at your site. You can configure the following aspects of auditing:

- Whether it is enabled or disabled
- Types of event that are audited
- Which users have their events audited
- Remote directories for storing audit records
- Threshold of local capacity at which a warning is issued
- Action when both audit partitions are full

The default audit policy is as follows:

- Auditing is enabled
- Records are dropped and counted when the audit trail is full
- All events are enabled for auditing
- Global user audit policy is set to enabled
- Per-user audit policy for all users is set to `default` (that is, enabled)
- Audit warning thresholds are set at 80 percent and 100 percent full
- Email warnings are disabled

Audit File Tools

You can manage audit files from the Service Processor, using a tool for viewing audit files. See the `viewaudit`(8) `man` page for details on this tool.

XSCF Shell Procedures for Auditing

This section describes these tasks:

- To Enable or Disable Writing of Audit Records to the Audit Trail
- To Configure an Auditing Policy
- To Display Whether Auditing is Enabled Or Disabled
- To Display Current Auditing Policy, Classes, or Events

▼ To Enable or Disable Writing of Audit Records to the Audit Trail

1. **Log in to the XSCF console with** `auditadm` **privileges.**
2. **Type the** `setaudit` **command:**

```
XSCF> setaudit enable|disable
```

where `enable` enables writing of audit records, and `disable` disables writing of audit records.

▼ To Configure an Auditing Policy

1. **Log in to the XSCF console with** `auditadm` **privileges.**
2. **Type the** `setaudit` **command:**

```
XSCF> setaudit [-p count|suspend] [-m mailaddr] [-a users=
enable|disable|default] [-c classes={enable|disable}] [-e events=
enable|disable] [-g {enable|disable}] [-t percents]
```

See the `setaudit`(8) `man` page for details on option information.

3. **Verify the operation with the** `showaudit all` **command:**

```
XSCF> showaudit all
```

▼ To Display Whether Auditing is Enabled Or Disabled

1. **Log in to the XSCF console with** `auditadm` **privileges.**
2. **Type the** `showaudit` **command:**

```
XSCF> showaudit
Auditing: enabled
```

▼ To Display Current Auditing Policy, Classes, or Events

1. **Log in to the XSCF console with** `auditadm` **privileges.**
2. **Type the** `showaudit all` **command:**

```
XSCF> showaudit all
```

Related Information

For additional information on this chapter's topics, see:

Resource	Information
`man` pages	`setaudit`(8), `showaudit`(8), `viewaudit`(8)
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide	Audit administration

CHAPTER 6

Log Archiving Facility

You can set up the Service Processor to automatically archive its log data on a remote host.

This chapter contains these sections:

- About Log Archiving
- Solaris OS Procedures for Log Archiving
- XSCF Shell Procedures for Log Archiving
- Related Information

About Log Archiving

The persistent storage space on a Service Processor is limited. A portion of this space is set aside for logs, such as audit logs and error logs. Due to the limited space, some logs can grow to the point where old log entries must be overwritten or deleted.

These sections provide details on log archiving:

- Using the Log Archiving Facility
- Archive Host Requirements
- Log Archiving Errors
- Using the `snapshot` Tool

Using the Log Archiving Facility

Log archiving increases the storage space available for logs on the Service Processor by transferring and storing log data on a server known as the *archive host*.

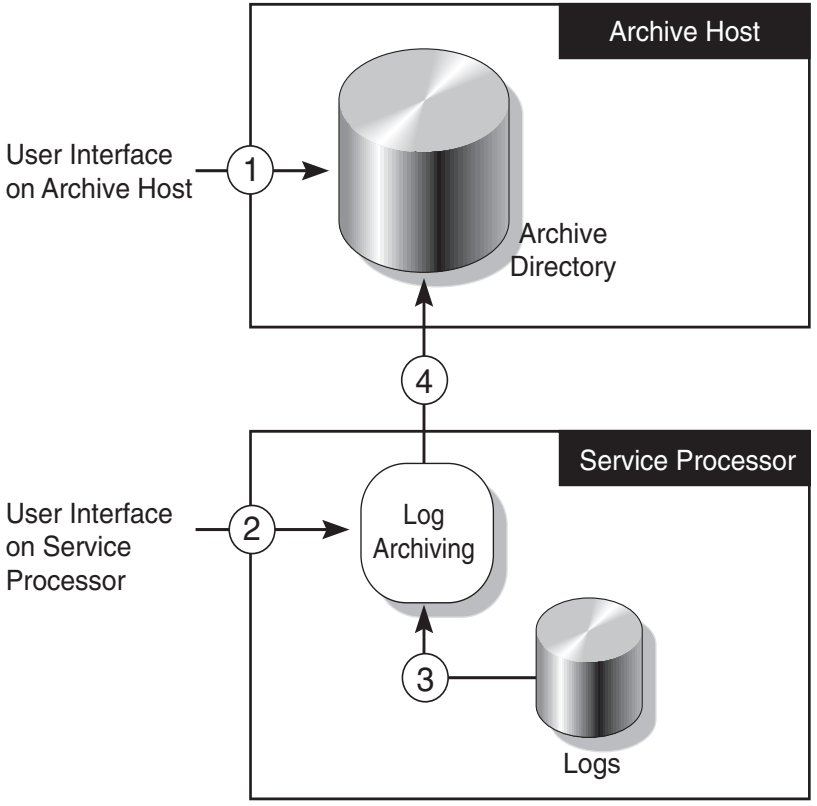
All connections established through log archiving are encrypted. The log archiving feature provides the ability to use an RSA public key to authenticate the archive host. You manage this public key on the Service Processor.

By default, log archiving is disabled. To use log archiving, you set up an archive host, and then enable log archiving on the Service Processor.

When enabled, log archiving periodically uses the secure copy program (`scp`) to transfer new log data to the archive host. Log archiving uses `ssh` to monitor the disk space consumed by archives. It deletes old archives when necessary, so that the space consumed by the archives will never exceed user-configurable archive space limits. However, for security reasons, log archiving does not automatically delete audit log archives. You can manually delete audit log archives that are no longer needed.

FIGURE 6-1 illustrates how log archiving works for a user interface on the archive host, and on the Service Processor.

FIGURE 6-1 Log Archiving



As shown in FIGURE 6-1,

(1) Before enabling log archiving, create an archive directory on the archive host. There should be a separate archive directory for each system that uses the archive host. The directory permissions should be set so that only authorized users can access its contents.

(2) You configure the log archiving feature.

(3) As new data accumulates in logs, log archiving polls log files at fixed intervals to determine when new data needs to be archived.

(4) Log archiving uses `scp` to transfer log data to the archive host. It uses `ssh` to manage the logs which it previously copied.

Archive Host Requirements

As the Service Processor keeps track of archive space on the archive host, you should not store other files in these archive directories.

It is possible to set up the Service Processor so that it uses one of the domains in the same system as an archive host. However, this configuration does not provide optimal reliability and serviceability. Typically, a separate, remote server functions as the archive host.

Log Archiving Errors

The log archiving system handles typical errors by retrying and recording errors in the Event Log. Possible error causes include archive host downtime, network outages, and misconfiguration of the Service Processor and/or the archive host. You can use the `showarchiving` command to view the details of the last ten archiving failures, including the first 1000 characters of output from any command that failed.

Using the `snapshot` Tool

Log data can also be collected and transferred from the Service Processor with the `snapshot` command. The `snapshot` tool does not extend or replace any other functionality, such as log archiving or logging of information using `syslog`. See the `snapshot`(8) `man` page for details on this tool.

Solaris OS Procedures for Log Archiving

▼ To Configure the Log Archive Host

1. **Select a user account on the server that will be used as the archive host that the Service Processor will use to log in.**
2. **Log in to the archive host and create an archive directory.**
3. **Set the permissions of the archive directory as desired. The Service Processor log-in account must have read, write, and execute (`rwx`) permissions.**

XSCF Shell Procedures for Log Archiving

This section describes these tasks:

- To Enable Log Archiving
- To Disable Log Archiving
- To Display Log Archiving Configuration and Status
- To Display Log Archiving Error Details

▼ To Enable Log Archiving

1. **Log in to the XSCF console with `platadm` privileges.**
2. **Type the `setarchiving` command:**

```
XSCF> setarchiving -t user@host:directory -r
```

where *user@host:directory* is the user name, log archive host, and directory where the logs are to be stored, and `-r` prompts for the password for `ssh` login. See the `setarchiving` `man` page for additional options.

3. **Type the** `setarchiving enable` **command:**

```
XSCF> setarchiving enable
```

After tests indicate the archive host is set up correctly, log archiving is enabled effective immediately. If the tests fail, you receive an error message that log archiving was not enabled, and the reason why.

▼ To Disable Log Archiving

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Type the** `setarchiving` **command:**

```
XSCF> setarchiving disable
```

▼ To Display Log Archiving Configuration and Status

1. **Log in to the XSCF console with** `platadm`**,** `platop`**, or** `fieldeng` **privileges.**
2. **Type the** `showarchiving` **command:**

```
XSCF> showarchiving
```

▼ To Display Log Archiving Error Details

1. **Log in to the XSCF console with** `platadm`**,** `platop`**, or** `fieldeng` **privileges.**
2. **Type the** `showarchiving` **command:**

```
XSCF> showarchiving -e
```

The details of the last ten archiving failures will be displayed.

Related Information

For additional information on this chapter's topics, see:

Resource	Information
man pages	`setarchiving`(8), `showarchiving`(8), `showlogs`(8), `snapshot`(8)
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide	Logs; saving logs to a USB device

CHAPTER 7

Capacity on Demand

This chapter describes how to manage system resources with the Capacity on Demand (COD) feature of your server.

Note – The COD feature is available only on high-end servers and those midrange servers designated as COD models. If you have a an entry-level server or a midrange server that is not a COD model, the information in this section does not apply.

This chapter contains these sections:

- About Capacity on Demand
- XSCF Shell Procedures for Using COD
- Related Information

For information on ordering and purchasing COD licenses, see the *COD User's Guide* for your server.

About Capacity on Demand

Capacity on Demand is an option that allows you to purchase spare processing resources (CPUs) for your server. The spare resources are provided in the form of one or more CPUs on COD boards that are installed on your server.

However, to access these COD CPUs, you must first purchase the COD right-to-use (RTU) licenses for them. Under certain conditions, you can use COD boards before entering the license information.

Note – The term *COD board* refers to a COD system board in a high-end server, and to a single-board COD model midrange server.

These sections provide details:

- COD Boards
- COD License Purchase
- License Installation
- License Allocation
- Headroom Management
- License Violations

COD Boards

A COD board is a system board that has been configured at the factory for COD capability. COD boards come in the same configurations as standard system boards. The number of CPUs per COD board depends on the configuration of your server.

COD boards are subject to the same limitations for mixed architectures and CPU speeds as system boards. Likewise, COD board software requirements, such as the Solaris OS or OpenBoot PROM version, are the same as those of system boards. Your server can have any combination of COD and system boards. It can even be configured entirely with COD boards.

Once a COD board has been licensed, you can configure it into domains in the same way as a system board. Until it has been activated (using licenses or headroom), however, you cannot configure it into a domain.

COD boards are identified by a special field-replaceable unit (FRU) ID and by a COD label. Except for their FRU ID, label, and COD capability, once COD boards are licensed, they are handled by the rest of the hardware and software in exactly the same way as system boards. COD boards fully support dynamic reconfiguration operations.

You can order COD boards either when you order your server, in which case they arrive already installed, or as an option. The midrange servers cannot add optional COD boards after shipment from the factory; COD boards must be included in the initial purchase order.

For more information about COD boards and replacing COD boards (field-replaceable units, or FRUs) in your server, see the *COD User's Guide* and the *Service Manual* for your server.

COD License Purchase

The purchase of a COD RTU license entitles you to receive a license *key*, which enables the appropriate number of COD processors. A license key can grant access to multiple RTUs.

A COD license is assigned to a specific server, one license per processor (CPU). All the licenses assigned to a server are handled as a floating pool of licenses for all the COD processors installed on that server. For example, if you have a server with two COD boards with four processors each, but you will only use six of those processors, all you need is six licenses. Those six licenses can be used by all eight processors, but only six at a time.

At least 50 license keys can be installed on a your server. A COD license has no expiration date.

A COD license can be used by any COD processor on the server. However, the license cannot be moved from one server to another. If COD processors are moved to another server, the license becomes invalid.

License Installation

A license key is comprised of text lines, which can be added to the COD license database. A single license key can grant access to multiple RTUs, as specified when the key is generated.

After you purchase a license, you must install the license keys in the COD license database. The license database is stored in nonvolatile memory on the Service Processor. In a system with more than one Service Processor, failover of the COD license database is supported. COD locks its license keys to the individual Chassis HostID of the system.

Note – In case the license database is lost or corrupted, make sure you keep copies of your licenses and license keys.

One way to preserve copies of your licenses and license keys is to save the output of the **showcodlicense -v** command. You can cut-and-paste the output to restore any lost license keys. For example:

```
XSCF> showcodlicense -v
Description  Ver    Expiration  Count   Status
-----------  ---    ----------  -----   ------
PROC         01     NONE        3       GOOD
01:803a9241:000000002:0301010100:3:00000000:XXXXXXXXXXXXXXXXXXXXX
PROC         01     NONE        2       GOOD
01:803a9241:000000003:0301010100:2:00000000:XXXXXXXXXXXXXXXXXXXXX
XSCF>
```

To restore lost licenses, enter a command similar to the following for each lost license:

```
XSCF> addcodlicense
01:803a9241:000000002:0301010100:3:00000000:XXXXXXXXXXXXXXXXXXXXX
```

License Allocation

The XSCF firmware allocates COD licenses automatically on a first-come, first-served basis. However, you can reserve licenses if you want to make sure a specific number of COD licenses are allocated to a particular domain.

Licenses are allocated to COD resources either when a domain with a COD board is powered on or when a new COD board is installed and powered on.

At board power on, the Service Processor determines which processing resources are in working order and requests licenses for them. The XSCF firmware checks its license database and current usage, determines which boards are COD boards, and allocates licenses to their resources. It then tells the Service Processor which resources to configure into the domain.

The Service Processor configures only the COD resources approved by the XSCF firmware. Any COD resource that remains unlicensed is not configured into the domain and is assigned a `COD-disabled` status.

When you remove a COD board from a domain through a reconfiguration operation, when a domain containing a COD board is shut down normally, or when the Service Processor detects a fault and unconfigures a board from the domain, the COD licenses for the resources on those boards are released and added to the pool of available licenses.

License allocation does not change during a Service Processor reboot or failover. All licenses remain allocated to their resources.

You can reserve COD licenses for specific domains by using the `setcod` command. After power on, reserved licenses are first allocated to their domains, and then remaining licenses are allocated on a first-come, first-served basis to the remaining resources. When a domain is powered off, the reverse happens: first the unreserved licenses are released to the pool, then the reserved licenses are released.

For example, assume your server had 10 COD licenses and you reserved them for these domains:

```
PROC RTUs reserved for domain 0: 4
PROC RTUs reserved for domain 1: 2
PROC RTUs reserved for domain 2: 0
PROC RTUs reserved for domain 3: 0
```

When the domains were first powered on, four licenses would be assigned to domain 0 and two licenses to domain 1. The remaining four licenses would be available on a first-come, first-served basis to all four domains (0, 1, 2, and 3).

Headroom Management

Caution – Before using headroom, be sure to read and understand the relevant topics in the *SPARC Enterprise M4000/M5000/M8000/M9000 Capacity on Demand (COD) User's Guide*.

Headroom is the capability to use up to four COD processors per server before entering the license information.

By default, COD resources arrive with headroom disabled. You can use the `setcod` command to establish it. However, if all your COD resources are already licensed, configuring headroom will have no effect. In that case, you need to install additional COD boards to retain your headroom capacity. You can also reduce or disable headroom at any time.

While headroom is in use, warning messages appear on the console every four hours. Once you either deactivate the COD board or obtain a license for the resources and enter the license keys, the warning messages stop. When a license key is added, the headroom is automatically reduced by the quantity provided by the license key.

License Violations

A license violation occurs if more resources are in use than are currently licensed on the server. These events can cause a license violation:

- The license database is lost or corrupted while the system is running. This state is detected on the subsequent reboot.

  This situation can be remedied by reentering the missing license keys, using the `addcodlicense` command.

- You delete COD licenses with the force option (`deletecodlicense -f`) while the server is still using those licenses.

  This could be a valid action in certain cases. For example, you might want to delete unwanted COD licenses, but want to delay shutting down the domain.

- You disable headroom while the server is still using those resources.

Once the system detects a license violation, the Service Processor will post a notice on the server console and ensure that no additional COD resources are brought online until the violation is corrected. In the meantime, it will not shut down domains or COD resources.

XSCF Shell Procedures for Using COD

This section describes these tasks:

- To Install a COD License
- To Delete a COD License
- To Reserve Licenses for Allocation
- To Increase or Decrease Headroom
- To Disable Headroom
- To Display COD Information
- To Display COD License Status
- To Display Usage Statistics for COD Resources

▼ To Install a COD License

This procedure installs a COD license and, if headroom is enabled, decreases headroom to compensate for each new license. This automatic reduction in headroom is designed to avoid accidental abuse of headroom. You can increase headroom again manually after installing the COD license. See "To Increase or Decrease Headroom" on page 91.

1. **Log in to the XSCF console with `platadm` privileges.**

2. **Type the** `addcodlicense` **command:**

```
XSCF> addcodlicense license-signature
```

where *license-signature* is the complete COD license key. For example:

```
XSCF> addcodlicense \
01:84000000:104:0301010100:3:00000000:xxxxxxxxxxxxxxx
```

3. **Verify that the license key was added to the license database by typing the** `showcodlicense -r` **command.**

   The COD RTU license key that you added should be listed in the `showcodlicense` output. See "To Display COD License Status" on page 92.

▼ To Delete a COD License

Before deleting a license, the XSCF firmware determines whether sufficient licenses are available from the pool of installed licenses plus headroom. If all licenses are in use and no headroom is available, the operation will fail. You can force the operation by using the `-f` option in Step 3, but doing so will overcommit any license reservations that might be in effect.

1. **Log in to the XSCF console with** `platadm` **privileges.**

2. **Verify that you have enough licenses or headroom to cover COD resources currently in use.**

   Use the `showcodlicense` command, as described in "To Display COD License Status" on page 92. If you do not have sufficient licenses or headroom to compensate, power off one or more domains or disconnect the appropriate number of boards.

3. **Type the** `deletecodlicense` **command:**

```
XSCF> deletecodlicense license-signature
```

where *license-signature* is the complete COD license key.

4. **Verify that the license key was removed from the license database by typing the** `showcodlicense -r` **command.**

   The COD RTU license key that you deleted should not be listed in the `showcodlicense` output. See "To Display COD License Status" on page 92.

▼ To Reserve Licenses for Allocation

You need to reserve licenses only if you want to make sure a specific number of COD licenses are allocated to a particular domain.

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Type the** `setcod` **command.**

   You can use one of two methods, as follows.

- Use `setcod` command with the `-d` *domain_id* and the *license_quantity* options:

```
XSCF> setcod -d domain_id license_quantity
```

For example:

```
XSCF> setcod -d 1 4
```

- Use the `setcod` command with no options.

  This option allows you to reserve licenses for all domains at once. First, the number of available licenses (8 in the example below) and the headroom quantity prompt are displayed:

```
XSCF> setcod
COD
---
PROC RTUs installed: 8
PROC Headroom Quantity (0 to disable, 4 MAX) [0]:
```

   a. **Enter a headroom number or press Return to leave the headroom unchanged.**

   The following prompts are displayed, in order:

```
PROC RTUs reserved for domain 0 (6 MAX) [0]:
PROC RTUs reserved for domain 1 (6 MAX) [2]:
PROC RTUs reserved for domain 2 (4 MAX) [0]:
PROC RTUs reserved for domain 3 (4 MAX) [0]:
```

   b. **Enter the number of licenses reserved for each domain.**

      The currently reserved number appears in parentheses. Do not exceed the number of available licenses. To leave a reservation unchanged, press Return.

3. **Verify the allocation with the** `showcod` **command.**

▼ To Increase or Decrease Headroom

1. **Log in to the XSCF console with** `platadm` **privileges.**
2. **Type the** `setcod` **command.**

   You can use one of two methods, as follows.

- Use `setcod` command with the *headroom* option:

```
XSCF> setcod headroom
```

  where *headroom* can be a number from 1 to 4. For example:

```
XSCF> setcod 4
```

- Use the `setcod` command with no options.

  If you are not sure of the headroom that is available, enter the `setcod` command with no options; the output displays the number of available licenses and the current headroom quantity (a number from 0 to 4).

```
XSCF> setcod
COD
---
PROC RTUs installed: 8
PROC Headroom Quantity (0 to disable, 4 MAX) [0]:4

WARNING: Using headroom requires you to install license key(s)
within 30 days.  Do you agree? [y|n]: y
```

  You are prompted to enter the *headroom* number. Press Return when finished.

3. **Verify the headroom quantity is correct by typing the** `showcod` **command.**

   For example, if you entered 4 as the headroom number, the output would be similar to:

```
XSCF> showcod
Chassis HostID: 80d88800
PROC RTUs installed: 8
PROC Headroom Quantity: 4
...
```

▼ To Disable Headroom

1. **Log in to the XSCF console with** `platadm` **privileges.**

2. **Type the** `setcod` **command and a headroom number of zero:**

```
XSCF> setcod 0
```

3. **Verify that the headroom is disabled by typing the** `showcod` **command.**

   For example:

```
XSCF> setcod 0

XSCF> showcod
Chassis HostID: 80d88800
PROC RTUs installed: 8
PROC Headroom Quantity: 0
...
```

▼ To Display COD Information

1. **Log in to the XSCF console with** `platadm`**,** `platop`**,** `domainadm`**, or** `domainop` **privileges, or** `domainmgr` **privileges for a specific domain.**

2. **Type the** `showcod` **command.**

   The output displays the server's Chassis HostID, number of licenses (`PROC RTUs installed`), headroom quantity, and number of licenses reserved for each domain. For example:

```
XSCF> showcod
Chassis HostID: 80e3e446
PROC RTUs installed: 10
PROC Headroom Quantity: 0
PROC RTUs reserved for domain 0: 4
PROC RTUs reserved for domain 1: 0
PROC RTUs reserved for domain 2: 0
PROC RTUs reserved for domain 3: 0
```

   To display COD information only for a specific domain, use the `showcod -d` *domain_id* command, where *domain_id* can be 0-23 depending on system configuration.

▼ To Display COD License Status

1. **Log in to the XSCF console with** `platadm` **or** `platop` **privileges.**

2. **Type the** `showcodlicense` **command.**

   The output displays the resource description, license version number, expiration date, number of licenses, and license status. For example:

```
XSCF> showcodlicense

Description  Ver   Expiration  Count  Status
-----------  ---   ----------  -----  ------
PROC          01         NONE      8  GOOD
```

   To display license information in raw key format, use the `-r` option. For example:

```
XSCF> showcodlicense -r

01:84000000:104:0301010100:3:00000000:xxxxxxxxxxxxxxx
```

   To display license information in verbose mode, use the `-v` option. For example:

```
XSCF> showcodlicense -v

Description  Ver   Expiration  Count  Status
-----------  ---   ----------  -----  ------
PROC          01         NONE      1  GOOD
01:84000000:000000001:0301010100:1:00000000:xxxxxxxxxxxxxxxxxxxxx
PROC          01         NONE      2  GOOD
01:84000000:000000004:0301010100:2:00000000:xxxxxxxxxxxxxxxxxxxxx
```

▼ To Display Usage Statistics for COD Resources

1. **Log in to the XSCF console with** `platadm` **or** `platop` **privileges, or** `domainadm`**,** `domainop`**, or** `domainmgr` **privileges for a specific domain.**

2. **Type the** `showcodusage` **command.**

   The output displays a summary of license usage by resource type and for each domain. For example:

```
XSCF> showcodusage

Resource       In Use  Installed  Licensed  Status
--------       ------  ---------  --------  ------
PROC                0          4         0  OK: 0 available
Domain/Resource  In Use  Installed  Reserved
---------------  ------  ---------  --------
0   - PROC            0          4         0
1   - PROC            0          0         0
2   - PROC            0          0         0
3   - PROC            0          0         0
Unused - PROC         0          0         0
```

   To display usage statistics only for domains or resources, use the `showcodusage -p domain` command or the `showcodusage -p resource` command. All COD usage information can be displayed with the `showcodusage -p all` command.

   You can also use the `showboards` command to identify which board is a COD board. The output from this command has a column titled “COD”. This column contains an “n” for a non-COD board or a “y” for a COD board. For example:

```
XSCF> showboards -v -a
XSB  R  DID(LSB)  Assignment  Pwr  Conn  Conf Test    Fault   COD
---  -  --------  ----------  ---  ----  ---- ----     ----    ---
00-0    SP        Unavailable n    n     n    Unknown Normal n
01-0    SP        Unavailable n    n     n    Fail    Failed n
```

```
XSCF> showboards -v -a
XSB  R  DID(LSB)  Assignment  Pwr  Conn  Conf Test    Fault   COD
---  -  --------  ----------  ---  ----  ---- ----     ----    ---
00-0 * 00(00)     Assigned    n    n     n    Unknown Normal y
01-0 * 00(04)     Assigned    n    n     n    Unknown Normal y
```

Related Information

For additional information on this chapter's topics, see:

Resource	Information
`man` pages	`setcod`(8), `showboards`(8), `showcodusage`(8), `showcodlicense`(8), `showcod`(8), `addcodlicense`(8), `deletecodlicense`(8)
SPARC Enterprise M4000/M5000/M8000/M9000 Servers Capacity On Demand (COD) User's Guide	Ordering COD licenses; additional COD procedures
Service Manual	Physical component removal; FRUs

APPENDIX **A**

Mapping Device Path Names

This appendix describes how to map device path names to physical system devices. It contains these sections:

- Device Mapping and Logical System Board Numbers
- CPU Mapping
- I/O Device Mapping

Device Mapping and Logical System Board Numbers

The physical address represents a physical characteristic that is unique to the device. Examples of physical addresses include the bus address and the slot number. The slot number indicates where the device is installed.

The logical system board (LSB) number affects both the processor numbering and the I/O device paths in the server. Physical resources are assigned to LSBs in the specified domain using the `setdcl` command. It is the LSB numbers that the Solaris OS uses.

CPU Mapping

Each LSB on a midrange or high-end server has a bank of 32 processor numbers assigned to it. For entry-level servers, the bank holds eight processors. The SPARC64 VI processor has two cores, each with two threads (also known as *virtual processors*). The SPARC64 VII processor has two cores or four cores, each with two threads.

An LSB on a midrange or high-end server has up to four processors (when a Uni-XSB is assigned to the LSB); therefore, the LSB needs 32 processor IDs. An LSB on an entry-level server, which supports only a single processor, requires only eight processor IDs.

TABLE A-1 shows the relationship between LSB numbers and starting processor (*proc*) numbers, in hexadecimal/decimal format. The Solaris `prtdiag`(IM) command provides the LSB numbers and CPU chip numbers in decimal format for components that are part of the domain.

TABLE A-1 LSB Numbers and Starting Processor Numbers

LSB Number	CPU Chip 0	CPU Chip 1	CPU Chip 2	CPU Chip 3
		Entry-Level Servers		
00	00/00	N/A	N/A	N/A
		Midrange and High-End Servers		
00	00/00	08/08	10/16	18/24
01	20/32	28/40	30/48	38/56
02	40/64	48/72	50/80	58/88
03	60/96	68/104	70/112	78/120
04	80/128	88/136	90/144	98/152
05	a0/160	a8/168	b0/176	b8/184
06	c0/192	c8/200	d0/208	d8/216
07	e0/224	e8/232	f0/240	f8/248
08	100/256	108/264	110/272	118/280
09	120/288	128/296	130/304	138/312
10	140/320	148/328	150/336	158/344
11	160/352	168/360	170/368	178/376
12	180/384	188/392	190/400	198/408
13	1a0/416	1a8/424	1b0/432	1b8/440
14	1c0/448	1c8/456	1d0/464	1d8/472
15	1e0/480	1e8/488	1f0/496	1f8/504

CPU Numbering Examples

This section contains examples of CPU numbering, using the output of the `showboards`(8) command on the Service Processor, and the output of the `prtdiag`(1M) command on the domain.

```
XSCF> showboards -a

XSB  DID(LSB) Assignment  Pwr  Conn Conf Test    Fault
---- -------- ----------- ---- ---- ---- ------- --------
00-0 00(00)   Assigned    y    y    y    Passed  Normal
00-1 00(01)   Assigned    y    y    y    Passed  Normal
00-2 00(04)   Assigned    y    y    y    Passed  Normal
00-3 00(05)   Assigned    y    n    n    Passed  Normal
01-0 01(00)   Assigned    y    y    y    Passed  Normal
01-1 01(09)   Assigned    y    y    y    Passed  Normal
01-2 01(06)   Assigned    y    n    n    Passed  Normal
01-3 01(07)   Assigned    y    n    n    Passed  Normal
```

```
domain_0# prtdiag -v
...
==================================== CPUs ====================================

       CPU              CPU            Run       L2$       CPU       CPU
LSB    Chip              ID            MHz        MB       Impl.     Mask
---    ----      --------------------  ----      ---       -----     ----
 00      0           0,   1,   2,   3   2150      4.0          6      129
 01      1          40,  41,  42,  43   2150      4.0          6      129
 04      2         144, 145, 146, 147   2150      4.0          6      129
 05      3         184, 185, 186, 187   2150      4.0          6      129

==============================================================================
```

```
domain_1# prtdiag -v
...
==================================== CPUs ====================================

       CPU              CPU            Run       L2$       CPU       CPU
LSB    Chip              ID            MHz        MB       Impl.     Mask
---    ----      --------------------  ----      ---       -----     ----
 00      0           0,   1,   2,   3   2150      4.0          6      129
 09      1         296, 297, 298, 299   2150      4.0          6      129
 06      2         208, 209, 210, 211   2150      4.0          6      129
 07      3         248, 249, 250, 251   2150      4.0          6      129

==============================================================================
```

I/O Device Mapping

I/O device paths are dictated by which LSB the I/O unit is assigned to.

Entry-level servers have one I/O controller. The XSB is assigned four PCIe slots.

Midrange servers have only one I/O controller on the I/O unit (IOU). For an XSB in Uni-XSB mode, all I/O is on XSB#*xx*-0. For an XSB in Quad-XSB mode, internal resources, the PCI-X slot, and two PCIe slots are on XSB#*xx*-0, and two PCIe slots are on XSB#*xx*-1.

High-end servers have two I/O controllers; therefore, each XSB can have two PCIe slots assigned to it.

TABLE A-2 shows the LSB numbers and the corresponding device path values that are used in I/O device mapping on the server.

TABLE A-2 LSB Numbers and Device Path Values

LSB Number	Device Path Value
00	No value
01	1
02	2
03	3
04	4
05	5
06	6
07	7
08	8
09	9
10	a
11	b
12	c
13	d
14	e
15	f

I/O Device Mapping on Entry-Level Servers

TABLE A-3 shows the device mapping on an entry-level server.

TABLE A-3 I/O Device Mapping on an Entry-level Server

PCIe Slot	Host Bus Adapter Slot Type	OpenBoot PROM Device Path
Slot 0	PCIe	/pci@0,600000/pci@0/pci@8
Slot 1	PCIe	/pci@1,700000/pci@0/pci@0
Slot 2	PCIe	/pci@1,700000/pci@0/pci@8
Slot 3	PCIe	/pci@1,700000/pci@0/pci@9

Internal Devices on Entry-Level Servers

The entry-level server has a single system board, at location XSB 00-0. Internal devices and device paths are shown in TABLE A-4.

TABLE A-4 Internal Devices and Device Paths on an Entry-level Server

XSB 00-0/IOU 0 Accessible Internal Devices	Device Physical Location	OpenBoot PROM Device Path
Network Port 0	System	/pci@0,600000/pci@0/pci@1/pci@0/network@4
Network Port 1	System	/pci@0,600000/pci@0/pci@1/pci@0/network@4,1
Network Port 2	System	/pci@0,600000/pci@0/pci@2/pci@0/network@4
Network Port 3	System	/pci@0,600000/pci@0/pci@2/pci@0/network@4,1
HD0	System	/pci@0,600000/pci@0/pci@0/scsi@0/disk@0
HD1	System	/pci@0,600000/pci@0/pci@0/scsi@0/disk@1
HD2	System	/pci@0,600000/pci@0/pci@0/scsi@0/disk@2
HD3	System	/pci@0,600000/pci@0/pci@0/scsi@0/disk@3
CD-RW/DVD-RW	System	/pci@0,600000/pci@0/pci@0/scsi@0/disk@4
SAS port	System	/pci@0,600000/pci@0/pci@0/scsi@0/*xx*@5,z, where *xx* the disk when connecting to a disk, or a tape when connecting to a tape drive unit.

I/O Device Mapping on Midrange Servers

TABLE A-5 shows the device mapping on a midrange server. In the device path, *x* is LSB-dependent, and is assigned a value as shown in TABLE A-2.

TABLE A-5 I/O Device Mapping on a Midrange Server

Slot	Host Bus Adapter Slot Type	OpenBoot PROM Device Path
IOU Slot 0	PCI-X	/pci@*x*0,600000/pci@0/pci@8/pci@0,1
IOU Slot 1	PCIe	/pci@*x*0,600000/pci@0/pci@9
IOU Slot 2	PCIe	/pci@*x*1,700000
IOU Slot 3	PCIe	/pci@*x*2,600000
IOU Slot 4	PCIe	/pci@*x*3,700000

Internal Devices on Midrange Servers

The internal midrange server devices, which are located at the XSB location 00-0 or 01-0 (regardless of Uni-XSB or Quad-XSB mode), are shown in TABLE A-6 and TABLE A-7. In the device path, *x* is LSB-dependent, and is assigned a value as shown in TABLE A-2.

TABLE A-6 Internal Devices and Device Paths on the Midrange Servers, IOU#0

XSB 00-0/IOU 0 Accessible Internal Devices (M4000/M5000)	Device Physical Location	OpenBoot PROM Device Path
Network Port 0	IOU#0	/pci@*x*0,600000/pci@0/pci@8/pci@0/network@2
Network Port 1	IOU#0	/pci@*x*0,600000/pci@0/pci@8/pci@0/network@2,1
HD0	System	/pci@*x*0,600000/pci@0/pci@8/pci@0/scsi@1/disk@0
HD1	System	/pci@*x*0,600000/pci@0/pci@8/pci@0/scsi@1/disk@1
CD-RW/DVD-RW	System	/pci@*x*0,600000/pci@0/pci@8/pci@0/scsi@1/disk@3
Tape	System	/pci@*x*0,600000/pci@0/pci@8/pci@0/scsi@1/tape@2

TABLE A-7 Internal Devices and Device Paths on the M5000 (but not M4000) Server, IOU#1

XSB 01-0/IOU 1 Accessible Internal Device (M5000)	Device Physical Location	OpenBoot PROM Device Path
Network Port 0	IOU#1	/pci@*x*0,600000/pci@0/pci@8/pci@0/network@2
Network Port 1	IOU#1	/pci@*x*0,600000/pci@0/pci@8/pci@0/network@2,1
HD2	System	/pci@*x*0,600000/pci@0/pci@8/pci@0/scsi@1/disk@0
HD3	System	/pci@*x*0,600000/pci@0/pci@8/pci@0/scsi@1/disk@1

I/O Device Mapping on High-End Servers

TABLE A-8 shows the device mapping on a high-end server. In the PCIe device path, *x* is LSB-dependent, and is assigned a value as shown in TABLE A-2. *xx* is the XSB number and is in the range from 00-15.

TABLE A-8 I/O Device Mapping on a High-end Server

PCIe Slot	Uni-XSB*	Quad-XSB†	OpenBoot PROM PCIe Device Path‡
IOU Slot 0	*xx*-0	*xx*-0	pci@*x*0,600000
IOU Slot 1	*xx*-0	*xx*-0	pci@*x*1,700000
IOU Slot 2	*xx*-0	*xx*-1	pci@*x*2,600000
IOU Slot 3	*xx*-0	*xx*-1	pci@*x*3,700000
IOU Slot 4	*xx*-0	*xx*-2	pci@*x*4,600000
IOU Slot 5	*xx*-0	*xx*-2	pci@*x*5,700000
IOU Slot 6	*xx*-0	*xx*-3	pci@*x*6,600000
IOU Slot 7	*xx*-0	*xx*-3	pci@*x*7,700000

* *xx* is the XSB number, 00-15

† *xx* is the XSB number, 00-15

‡ *x* is LSB-dependent, assigned a value as shown in TABLE A-2

Internal Devices on High-End Servers

The IOUA is a PCIe Host Bus Adapter that provides access to internal devices when installed at specific locations. The IOUA contains two 1Gb Ethernet ports on the card ("on-board"). When the IOUA is installed at specific locations, it also provides access

to storage located on the IOU, as well as platform CD-RW/DVD-RW drive or tape drive resources at the locations shown in TABLE A-9. In the PCIe device path, *x* is LSB-dependent, and is assigned a value as shown in TABLE A-2. *xx* is the XSB number and is in the range from 00-15. *nn* is the number associated with the PSB to which the CD-RW/DVD-RW drive or tape drive is attached, as further explained in the table footnote.

TABLE A-9 Internal Devices and Device Paths on a High-end Server

PCIe Slot	Uni-XSB*	Quad-XSB†	OpenBoot PROM PCIe Device Path‡	OpenBoot PROM IOUA HBA On-board, IOU, and Platform Accessible Devices**
IOU Slot 0	*xx*-0	*xx*-0	pci@*x*0,600000	.../pci@0,1/network@1 (IOUA HBA On-board BGE Port 0) .../pci@0,1/network@1,1 (IOUA HBA On-board BGE Port 1) .../pci@0/scsi@1/disk@0 (IOU HD0; SCSI Target 0) .../pci@0/scsi@1/disk@1 (IOU HD1; SCSI Target 1) .../pci@0/scsi@1/disk@4 (Platform CD-RW/DVD-RW at cfgdevice port *nn*-0; SCSI Target 4) .../pci@0/scsi@1/tape@5 (Platform tape at cfgdevice port *nn*-0; SCSI Target 5)
IOU Slot 1	*xx*-0	*xx*-0	pci@*x*1,700000	
IOU Slot 2	*xx*-0	*xx*-1	pci@*x*2,600000	.../pci@0,1/network@1 (IOUA HBA On-board BGE Port 0) .../pci@0,1/network@1,1 (IOUA HBA On-board BGE Port 1) .../pci@0/scsi@1/disk@4 (Platform CD-RW/DVD-RW at cfgdevice port *nn*-2; SCSI Target 4) .../pci@0/scsi@1/tape@5 (Platform tape at cfgdevice port *nn*-2; SCSI Target 5)
IOU Slot 3	*xx*-0	*xx*-1	pci@*x*3,700000	.
IOU Slot 4	*xx*-0	*xx*-2	pci@*x*4,600000	.../pci@0,1/network@1 (IOUA HBA On-board BGE Port 0) .../pci@0,1/network@1,1 (IOUA HBA On-board BGE Port 1) .../pci@0/scsi@1/disk@0 (IOU HD2; SCSI Target 0) .../pci@0/scsi@1/disk@1 (IOU HD3; SCSI Target 1) .../pci@0/scsi@1/disk@4 (Platform CD-RW/DVD-RW at cfgdevice port *nn*-4; SCSI Target 4) .../pci@0/scsi@1/tape@5 (Platform tape at cfgdevice port *nn*-4; SCSI Target 5)

TABLE A-9 Internal Devices and Device Paths on a High-end Server *(Continued)*

PCIe Slot	Uni-XSB*	Quad-XSB†	OpenBoot PROM PCIe Device Path‡	OpenBoot PROM IOUA HBA On-board, IOU, and Platform Accessible Devices**
IOU Slot 5	*xx*-0	*xx*-2	pci@*x*5,700000	
IOU Slot 6	*xx*-0	*xx*-3	pci@*x*6,600000	.../pci@0,1/network@1 (IOUA HBA On-board BGE Port 0) .../pci@0,1/network@1,1 (IOUA HBA On-board BGE Port 1) .../pci@0/scsi@1/disk@4 (Platform CD-RW/DVD-RW at cfgdevice port *nn*-6; SCSI Target 4) .../pci@0/scsi@1/tape@5 (Platform tape at cfgdevice port *nn*-6; SCSI Target 5)
IOU Slot 7	*xx*-0	*xx*-3	pci@*x*7,700000	

* *xx* is the XSB number, in the range of 00-15.

† *xx* is the XSB number, in the range of 00-15.

‡ *x* is LSB-dependent, and is assigned a value as shown in TABLE A-2.

** *nn* is the number associated with the PSB to which the CD-RW/DVD-RW drive or tape drive is attached, as follows: for an M8000 server, *nn* is in the range of 0-3; for an M9000 server, *nn* is in the range of 0-7; for an M9000 server plus expansion unit, *nn* is in the range of 0-15.

Sample `cfgadm` Output

This section contains:

- Sample output for the command `cfgadm -s "select=class(pci)"` on an *unpopulated* server. As you connect devices, the `cfgadm` output will change to reflect the device type and connection status on your server.
- The device matrix for midrange and for high-end servers, when the IOU is configured as part of a domain. I/O portions of the IOU resources may be in different domains.

Entry-Level Server

The entry-level server does not support PCI hotplug. Therefore, the concepts of attachment points and classes do not apply, and executing the command

```
cfgadm -s "select=class(pci)"
```

either would produce an error or display nothing.

Midrange Servers

M4000 Server sample output:

```
# cfgadm -s "select=class(pci)"
Ap_Id                          Type         Receptacle   Occupant     Condition
iou#0-pci#0                    unknown      empty        unconfigured unknown
iou#0-pci#1                    unknown      empty        unconfigured unknown
iou#0-pci#2                    unknown      empty        unconfigured unknown
iou#0-pci#3                    unknown      empty        unconfigured unknown
iou#0-pci#4                    unknown      empty        unconfigured unknown
```

M5000 Server sample output:

```
# cfgadm -s "select=class(pci)"
Ap_Id                          Type         Receptacle   Occupant     Condition
iou#0-pci#0                    unknown      empty        unconfigured unknown
iou#0-pci#1                    unknown      empty        unconfigured unknown
iou#0-pci#2                    unknown      empty        unconfigured unknown
iou#0-pci#3                    unknown      empty        unconfigured unknown
iou#0-pci#4                    unknown      empty        unconfigured unknown
iou#1-pci#0                    unknown      empty        unconfigured unknown
iou#1-pci#1                    unknown      empty        unconfigured unknown
iou#1-pci#2                    unknown      empty        unconfigured unknown
iou#1-pci#3                    unknown      empty        unconfigured unknown
iou#1-pci#4                    unknown      empty        unconfigured unknown
```

TABLE A-10 `cfgadm` Device Matrix for Midrange Servers

PCI Slot #	PCI Slot Type	IOU#0 (M4000/M5000)	IOU#1 (M5000)
0	PCI-X	iou#0-pci#0	iou#1-pci#0
1	PCIe	iou#0-pci#1	iou#1-pci#1
2	PCIe	iou#0-pci#2	iou#1-pci#2
3	PCIe	iou#0-pci#3	iou#1-pci#3
4	PCIe	iou#0-pci#4	iou#1-pci#4

High-End Servers

M8000 Server sample output:

```
# cfgadm -s "select=class(pci)"
Ap_Id                          Type         Receptacle   Occupant     Condition
iou#1-pci#0                    unknown      empty        unconfigured unknown
iou#1-pci#1                    unknown      empty        unconfigured unknown
iou#1-pci#4                    unknown      empty        unconfigured unknown
iou#1-pci#5                    unknown      empty        unconfigured unknown
iou#1-pci#6                    unknown      empty        unconfigured unknown
iou#1-pci#7                    unknown      empty        unconfigured unknown
```

M9000 Server sample output:

```
# cfgadm -s "select=class(pci)"
Ap_Id                          Type         Receptacle   Occupant     Condition
iou#0-pci#0                    unknown      empty        unconfigured unknown
iou#0-pci#1                    unknown      empty        unconfigured unknown
iou#0-pci#2                    unknown      empty        unconfigured unknown
iou#0-pci#3                    unknown      empty        unconfigured unknown
iou#0-pci#4                    unknown      empty        unconfigured unknown
iou#0-pci#5                    unknown      empty        unconfigured unknown
iou#0-pci#6                    unknown      empty        unconfigured unknown
iou#0-pci#7                    unknown      empty        unconfigured unknown
iou#3-pci#0                    unknown      empty        unconfigured unknown
iou#3-pci#1                    unknown      empty        unconfigured unknown
iou#3-pci#2                    unknown      empty        unconfigured unknown
iou#3-pci#3                    unknown      empty        unconfigured unknown
```

TABLE A-11 `cfgadm` Device Matrix for High-End Servers

PCI Slot #	PCI Slot Type	IOU#0	IOU#1	IOU#*n**
0	PCIe	iou#0-pci#0	iou#1-pci#0	iou#*n*-pci#0
1	PCIe	iou#0-pci#1	iou#1-pci#1	iou#*n*-pci#1
2	PCIe	iou#0-pci#2	iou#1-pci#2	iou#*n*-pci#2
3	PCIe	iou#0-pci#3	iou#1-pci#3	iou#*n*-pci#3
4	PCIe	iou#0-pci#4	iou#1-pci#4	iou#*n*-pci#4
5	PCIe	iou#0-pci#5	iou#1-pci#5	iou#*n*-pci#5
6	PCIe	iou#0-pci#6	iou#1-pci#6	iou#*n*-pci#6
7	PCIe	iou#0-pci#7	iou#1-pci#7	iou#*n*-pci#7

* *n* is the IOU number

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